



**SPREP
OCCASIONAL PAPER SERIES**

**LAST COPY
DO NOT
REMOVE**

NO. 1

**THE INTERNATIONAL
TRANSFER AND DISPOSAL
OF HAZARDOUS WASTES.**

**South Pacific Commission
Noumea, New Caledonia**

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

(SPREP)

SOUTH PACIFIC COMMISSION

NOUMEA, NEW CALEDONIA

SPREP OCCASIONAL PAPER SERIES

NO. 1

**THE INTERNATIONAL
TRANSFER AND DISPOSAL
OF HAZARDOUS WASTES.**

The author has kindly given permission for the South Pacific Regional Environment Programme (SPREP) to re-produce this paper for use in the SPREP OCCASIONAL PAPER SERIES. This enables us to disseminate valuable information to the region in a speedy and cost-effective manner.

PACIFIC BASIN CONSORTIUM FOR HAZARDOUS WASTE RESEARCH

Secretariat address:

c/o East-West Center
Environment and Policy Institute
1777 East-West Road
Honolulu, Hawaii 96848

Telephone: (808)944-7555
Cable: EASWES/EN
Telex: 989171
FAX: (808)944-7970



THE INTERNATIONAL TRANSFER AND DISPOSAL OF HAZARDOUS WASTES

prepared for

The South Pacific Regional Environment Programme (SPREP)

by

The Pacific Basin Consortium for Hazardous Waste Research (PBCHWR)

September 1988

(The Intergovernmental Meeting on the SPREP Action Plan at Noumea, New Caledonia, June 27-July 1, 1988, resolved to ask the PBCHWR to prepare a concise paper informing government officials and other interested parties of the facts concerning hazardous wastes. Radioactive wastes are not covered herein because their transfer and disposal are strictly regulated by the International Atomic Energy Agency and producers of nuclear energy. This paper was prepared by PBCHWR officials and staff. It was reviewed by the Consortium Board of Directors and other knowledgeable professionals for technical accuracy. Copies are available from the SPREP offices in the South Pacific Commission, B.P. D5, Noumea Cedex, New Caledonia, or the PBCHWR Secretariat, Environment and Policy Institute, East-West Center, 1777 East-West Road, Honolulu, Hawaii 96848 USA.)

BACKGROUND

The international transfer of hazardous waste for treatment and disposal has rapidly increased in recent years. Some of this trade is responsible and legitimate, involving movement of wastes from one country to another for most effective disposal or for recycling purposes. Some of the international waste transfers that are proposed or are taking place, however, may not be in the best interests of the receiving country. This trend toward international transfer is expected to continue over the next few years, and information must be made available to those responsible for the interests of nations being approached as potential hazardous waste treatment and disposal sites.

Transfer companies usually propose to build a facility that will primarily accommodate imported hazardous wastes as well as whatever small amounts may be generated by local industries. This report provides general information to government officials, opinion leaders, and other interested parties about the potential risks associated with the transfer, treatment, storage, and disposal of hazardous chemical wastes. The report suggests important questions to be asked of proponents of waste transfer and disposal by those countries that are approached. Finally, it provides contacts for additional assistance and information. Any proposals should be evaluated on a site-specific basis by competent independent experts before a decision is made.

WHAT ARE HAZARDOUS WASTES?

All societies produce wastes (i.e., household garbage, sewage, municipal solid wastes, by-products of manufacturing, agricultural wastes, and industrial discharges). Waste minimization is a proper technological goal, but its achievement is not expected to eliminate the waste disposal problem. Chemical use for various purposes is rapidly increasing with economic growth in many countries. Some of these chemicals can damage human health and plants and animals if they are released into the environment. These chemical compounds are termed hazardous, and when they are no longer useful or are discarded, they are called hazardous wastes. Wastes may be in the form of liquids, gases, solids, emulsions, slurries, or sludges and are almost always complex mixtures of different chemical compounds.

A chemical or waste is termed hazardous because of one or more of the following characteristics:

Toxicity to humans, plants, or animals. Poisonous effects may range from minor irritation to cancer. The effects may be instantaneous or appear only after long exposure.

Flammability or explosivity. Some wastes are combustible and may form explosive mixtures with air or other chemicals.

Corrosivity or chemical reactivity. Strong acids or caustic bases may corrode containers or damage materials they contact.

The degree of hazard varies widely and, under unusual conditions of mishandling or misuse, almost any chemical might be hazardous. Hazardous chemicals may be mixed with nonhazardous substances or be dissolved or suspended in water; thus, their proportion or concentration also determines the degree of hazard. Packaging materials may become contaminated with hazardous chemicals and become hazardous themselves. Waste oils, incinerator ashes, paint residues, metal finishing sludges, and contaminated solvents are common forms of hazardous waste. The more dangerous chemicals, which may be present in hazardous wastes, include:

- Metals: e.g., cadmium, chromium (hexavalent), lead, mercury
- Pesticides: e.g., arsenicals, chlorinated hydrocarbons
- Solvents: e.g., trichloroethylene, perchloroethylene, benzene
- Cyanides
- Polychlorinated biphenyls (PCB), chlorinated phenols, dioxins, furans
- Polynuclear aromatic hydrocarbons (PAH)
- Volatile organic compounds (VOC): e.g., chloroform, carbon tetrachloride
- Highly toxic organic intermediates: aniline, phosgene
- Strong acids and alkalis
- Pathogenic organisms: e.g., hospital wastes

HOW ARE HAZARDOUS WASTES TREATED?

At present, no single technology can completely detoxify all forms of hazardous waste. An existing hazardous waste treatment and disposal method may be suitable for some wastes but not for others. Although secure landfill and incineration are the most widely used means of disposing of hazardous waste, these technologies are not entirely free from risk. Storage is designed to contain wastes temporarily during transit or while awaiting treatment. Disposal methods are for long-term isolation of wastes from the biosphere.

Landfilling is the burial of waste in trenches or pits carved out of the earth. Secure landfills feature a waterproof bottom liner, a leachate collection system, and a rain-shedding cover. They require close monitoring and maintenance to prevent toxic leachate from passing through the liner and into groundwater that lies below the landfill. Leaching of toxic chemicals into groundwater may contaminate drinking water or irrigation supplies. Improper

installation and damage during or after installation of a liner are problems in the making of secure landfills.

Of particular importance is selection of a site with proper geological and hydrological features such as low rainfall and impermeable subsurface layers to resist outmigration of toxic leachate. Finding a "best" and safest site involves extensive tests and careful comparisons by using a wide range of technical criteria.

Since secure landfills are a relatively new technology, data do not yet exist on their long-term performance. Hazardous wastes may remain threatening over long periods of time, depending on their rate of decomposition. Liners, leachate collection systems, and leak detectors must be maintained in good working order for decades.

Municipal landfills are not designed to handle hazardous wastes. This method of disposal has clearly been shown to contaminate surface and groundwater and has been outlawed in many countries.

Physical, chemical or biological treatment processes comprise a wide range of technologies that reduce the amount and toxicity of wastes (e.g., filtration, neutralization of acids or bases, and bacteriological digestion). In general, treatment is an intermediate step and the residues still must be handled appropriately.

Incineration involves combustion or high temperature treatment of wastes. If properly carried out, incineration is an effective means of destroying some types of hazardous waste including chlorinated materials such as PCB. The simultaneous incineration of hazardous waste with the generation of power in a steam boiler, known as cogeneration, is not, however, thought to be a viable procedure because of potential damage to boiler tubes from the corrosive products of waste combustion.

The possibility that combustion will be incomplete is also a risk associated with incineration and may result in a significant amount of hazardous substances (gases or ash particles) being inadvertently released into the environment. The ashes from incinerating toxic wastes may be hazardous themselves (e.g., heavy metals are not burned or volatilized) and thus continue to pose a disposal problem. Uncertainty of proper operation, along with concerns of transport and handling, has led to the refusal of many communities to accept a hazardous waste incinerator in their area.

Stabilization, or solidification, is a process to isolate wastes by which liquids or slurries containing hazardous chemicals are converted, with the addition of a binding agent such as cement, into solid masses suitable for burial in secure landfills. Stabilization appears to be a disposal option for those wastes that are not suitable for incineration, such as inorganic waste sludges containing heavy metals. Stabilized wastes are less likely to be leached.

Storage of hazardous waste in one form or another continues from the time the waste is generated until it is finally disposed of. Typically, storage is in containers or bulk tanks depending on the volume and physical character (wet or dry) of the waste, the distance it must travel, and the mode of transportation.

Transportation of hazardous waste may be by rail, road, river, or ocean-going vessels, and often it is a combination of these. Rarely, if ever, is it transported by air. The chance of an accidental spill or other mishap is especially great when the waste is being handled. It must be taken out of storage and transferred from one type of container or transportation mode to another (e.g., offloaded from ships and then again from the dock into trucks that carry it to the waste disposal facility).

The international transfer of these materials presents many possibilities for accidents in handling that may rupture containers and pipes resulting in contamination of the environment and subsequent exposure of human beings to toxic chemicals. In addition, ocean transport carries the risk of accidental or illegal discharge to the marine environment.

WHY ARE HAZARDOUS WASTES NOT ALWAYS TREATED AND DISPOSED OF IN THE COUNTRY OF ORIGIN?

In many countries, laws and regulations limit introduction of hazardous chemical wastes into the biosphere, and prohibit human exposure to hazardous wastes through eating or drinking contaminated food and beverages, or through skin contact, or through inhalation of contaminated dusts and vapors. Complying with these laws is expensive, and it is not unusual for proper disposal to cost several U.S. dollars per kilogram of waste.

People everywhere are growing increasingly averse to the siting of hazardous waste facilities in their communities. Although most persons recognize that these wastes must receive proper treatment and disposal, they fear that an accident may occur or that routine low-level emissions of pollutants into the surrounding air, water, or soil may eventually harm their health. As a result, businesses who dispose of wastes are unable to find suitable locations for their landfills, incinerators, and treatment plants. It may be cheaper for them to ship their hazardous waste to a country where regulations regarding proper handling, storage, treatment, and disposal of such wastes are not as stringent. Furthermore, a less industrialized country may not yet be aware of the possible dangers of hazardous wastes. Fees for acceptance of wastes may also loom large. New jobs, creation of associated local industries using reclaimed materials, and treatment of existing locally generated wastes are benefits that are often postulated. Thus, the economic motivations for both exporter and importer in international transfer seem strong.

WHAT ARE THE RISKS OF HAZARDOUS WASTE TREATMENT AND DISPOSAL?

Risk is the chance that damage or injury will occur. Even wastes managed according to the most stringent guidelines and regulations may pose risks due to unforeseen circumstances.

In evaluating whether or not to accept hazardous wastes or a treatment and/or disposal facility, the net risk of the project must be considered. This means that all plausible impacts, both positive and negative, on the people and the environment must be considered and carefully weighed. Some of the questions to be asked of a proponent of waste transfer by the host community are:

- 1) What are the wastes, and are they legally defined as hazardous in the exporting country?
- 2) How would these wastes be treated according to the laws of the exporting country? What would be the average cost per unit weight of such treatment?
- 3) What is the design of the proposed facility, its capital cost, expected annual capacity, and its lifetime?
- 4) What are the potential effects of exposure to the wastes on public health, worker health, plants, animals, and property?
- 5) If an accident should occur, how and to what extent could damage be controlled to protect people and the environment?
- 6) Would the proposed facility meet all environmental and health regulations in the exporting country?
- 7) What supervision, inspection, and monitoring are necessary for construction, operation, and maintenance of disposal/treatment/storage facilities and sites? What training of local personnel is necessary?
- 8) What is the financial stability of the waste management company and how can dependable long-term operation be assured?
- 9) What is the liability of waste generators, brokers, transporters, and recipients? How is it established and documented?
- 10) Does the government of the exporting country know about the proposed waste transfer? Is an export permit required?

These and related questions should be asked and satisfactorily answered before proceeding with plans to build a hazardous waste facility.

WHAT IS THE PRINCIPLE OF PRIOR INFORMED CONSENT?

Many nations are involved in exporting or importing hazardous wastes with some playing both roles. Therefore, discussions are underway to devise uniform regulations and policies for transferring these materials.

One principle that has evolved is to ensure that the receiving nation (1) is informed of the chemical composition of the wastes, proper treatment, facilities needed, and the associated risks, and (2) agrees to accept the wastes before shipment occurs. Application of this principle requires that importing nations be alert and request information from governments of exporting nations when proposals to transfer hazardous wastes are made by private organizations. Exporting nations may impose a requirement for documenting information provided to consignees and their consent to accept the wastes. This system is not fool-proof, and it is difficult to ensure that importers understand the risks they may incur.

A second approach is to negotiate bilateral agreements between nations for the government-supervised transfer of hazardous materials that are so designated and restricted within one nation. The necessary technical information exchange should be included in such agreements.

At present, no nation forbids the transfer of hazardous waste beyond its borders if informed consent of the importing nation is established. Several nations, however, strictly control the export and import of chemicals considered particularly dangerous such as polychlorinated biphenyls, ingredients for the manufacture of illegal drugs and munitions, and radioactive materials.

RESOURCE ORGANIZATIONS

The following international organizations are involved in hazardous waste management issues. They may be contacted for further information and for help on specific problems relating to hazardous waste.

For countries and territories of the South Pacific, the South Pacific Regional Environment Programme (SPREP) provides information and advice on all aspects of environmental management, including hazardous waste. SPREP assists and coordinates the involvement of larger international environmental programs in the Pacific. In addition, it helps in facilitating responses and long-term planning

and information needs of Pacific governments for hazardous wastes.

South Pacific Regional Environment Programme (SPREP)
B.P. D5
Noumea Cedex, New Caledonia

Phone: 26.20.00
Telex: SOPACOM 3139 NM
Fax: (687) 26.38.18

The Environment Directorate of the Organisation for Economic Cooperation and Development (OECD) has been active in developing policies for the proper monitoring and control of international movement of hazardous wastes. They have published a number of useful documents including "Transfrontier Movements of Hazardous Wastes: Legal and Institutional Aspects." A uniform regulation is expected by late 1988.

Organisation for Economic Cooperation and Development (OECD)
Environment Directorate
2, rue Andre-Pascal (Annex Maillot)
F-75 775 Paris Cedex 16, France

Phone: 33(01)45027626
Telex: 620120

The United Nations Environment Programme (UNEP) maintains extensive databases on hazardous chemicals and provides guidelines for hazardous waste management. The IRPTC (International Register for Potentially Toxic Chemicals) is a global information exchange network and a central database developed by UNEP for the assessment and control of environmental hazards. The database contains special files on hazardous properties of chemicals and on spills and treatment and disposal of waste chemicals.

An International Convention on the Transboundary Movement of Hazardous Wastes is being drafted and may be agreed upon in 1989.

The Industry and Environment Office (IEO) of UNEP has developed guidelines for environmental management of industrial facilities. In addition to supplying information and advice drawn from their own resources, UNEP can also suggest specialists to help on problems with which they are unable to provide direct assistance.

United Nations Environment Programme (UNEP)
Regional Office for Asia and the Pacific
The United Nations Building
Rajdamnern Avenue
Bangkok 10200, Thailand

Phone: 2829161-200
Telex: 82392TH

United Nations Environment Programme (UNEP)
Industry and Environment Office (IEO)
Tour Mirabeau
39-43 quai Andre Citroen
75739 Paris Cedex 15, France

Phone: 45-78-33-33
Telex: 204997
Fax: 45783234 (COFRAMINES)

International Register for Potentially Toxic Chemicals (IRPTC)
Palais des Nations
CH-1211 Geneva 10, Switzerland

Phone: 98-58-50
Telex: 28877

The World Health Organization (WHO) has a Division of Environmental Health, which is active in the prevention of environmental pollution relating to hazardous wastes. In conjunction with UNEP and the World Bank, they are preparing a "Technical Manual for the Safe Disposal of Hazardous Wastes with Special Emphasis on the Problems and Needs of Developing Countries." Although it does not address the transnational shipment problem, the manual describes the relative risks of various types of hazardous waste treatment and disposal. The International Programme on Chemical Safety (IPCS), established by WHO, UNEP, and the ILO, deals with assessment of health risks of potentially toxic chemicals, including toxic wastes, and prevention of hazards due to chemical use, storage, and transport. The IPCS provides practical advice on matters such as the safe storage, handling, and disposal of chemicals; hazard identification; and accident prevention.

World Health Organization (WHO)
Division of Environmental Health
Avenue Appia
CH-1211 Geneva 27, Switzerland

Phone: (01) 29-01-11
Telex: 15348

International Programme on Chemical Safety (IPCS)
CH-1211 Geneva 27, Switzerland

Phone: 91-35-71
Telex: 27821 OMS

Western Pacific Regional Centre for the Promotion of
Environmental Planning and Applied Studies (PEPAS)
P.O. Box 12550
50782 Kuala Lumpur, Malaysia

Phone: (03) 9480311
Telex: 31064
Fax: 03-248-3282

The United Nations Centre on Transnational Corporations (UNCTC) provides support to governments seeking advice on the environmental aspects of foreign direct investment projects, including assistance in negotiation of contracts with transnational corporations supplying potentially hazardous technologies.

United Nations Centre on Transnational Corporations (UNCTC)
Advisory and Information Services Division
United Nations
New York, NY 10017 USA

Phone: (212) 963-3169
Telex: UNCTC 661062
Fax: (212) 963-4116

Greenpeace International, a non-government organization, is actively involved in alerting governments and the public to the dangers associated with hazardous waste. They maintain extensive records and have conducted policy analyses, which are available upon request, on the international trade in hazardous wastes. Their position is that international commerce in hazardous wastes inevitably releases contaminants into countries of import, and simultaneously discourages reducing wastes at their point of origin.

Greenpeace International
1436 U Street, N.W.
Washington, D.C. 20009 USA

Phone: (202) 462-1177
Telex: 89-2359
Fax: (202) 462-4507

The International Environmental Bureau (IEB) responds to requests for information on environmental protection technology. The IEB acts to identify appropriate sources of information and technical experts who may provide assistance on problems relating to disposal of waste material, plant siting, and evaluation of pollution control technology.

International Environmental Bureau (IEB)
G1, Route de Chene
CH-1208 Geneva, Switzerland

Phone: (22) 86-51-11
Telex: 289556
Fax: (41)(22) 36-03-36 (Laurens)

The Pacific Basin Consortium for Hazardous Waste Research (PBCHWR) promotes research on treatment methods for hazardous waste and the exchange of hazardous waste handling information. The PBCHWR maintains a network of more than 100 institutions involved with hazardous waste research and management and acts as a referral service, as well as a primary source of information on hazardous waste issues.

Pacific Basin Consortium for Hazardous Waste Research (PBCHWR)
c/o Environment and Policy Institute
East-West Center
1777 East-West Road
Honolulu, HI 96848 USA

Phone: (808) 944-7555
Telex: 989171
Fax: (808) 944-7970