OVERVIEW

The Global Search for POPs Stockpiles: Enormous stockpiles of dangerous persistent organic pollutants (POPs) exist throughout the world, such as PCBs found in electrical equipment and 'old' POPs pesticides that have already been banned in many countries. One of the expected outcomes of the first international treaty on POPs will be a worldwide focus on identifying and destroying these unwanted stockpiles of toxic pollutants.

The Problem Of Toxic Waste Disposal: Due to the inherent properties of POPs (i.e. they are toxic, resist natural decomposition, and accumulate in living creatures and the environment), any release of POPs into the environment is potentially harmful and therefore unacceptable.

According to the US Environment Protection Agency, chemicals with these properties "have the potential to pose *significant* exposures to humans and ecosystems over a longer period of time; even small amounts of [POPs] chemicals that enter the environment can accumulate to elevated concentrations in the environment and in organisms, and therefore have a greater potential to result in adverse effects on human health and the environment."[1]

It is therefore vital that the search for POPs stockpiles is accompanied by a worldwide search for the most appropriate and effective means of destroying them.

Failure of traditional disposal methods: In many of the OECD nations, POPs wastes are routinely burnt in incinerators costing tens if not hundreds of millions of dollars. Many nations – the USA and Canada included – also permit the burning of POPs wastes in boilers, metal furnaces, cement kilns and other systems that were not designed for this purpose. Other disposal means for POPs have included deep well injection, land-spreading and burial in subterranean salt cavities.

The scientific evidence of the environmental and public health impacts of incinerators, cement kilns and similar combustion systems has created strong public opposition to burning of POPs. Governments have reacted by focussing on regulations that reduce air emissions of dioxins. However, this regulatory focus on air emissions may not have reduced the levels of dioxins produced, but simply transferred the dioxin load from the air to other media (eg. solid wastes from pollution control equipment – ashes, dusts, sludges).

Of great concern is that these residues are usually buried in landfills or, worse still, used for commercial products such as agricultural fertiliser leading to soil and crop contamination. Recent studies from the EU showing that the levels of dioxins and furans in solid wastes are far higher than emissions to air tend to support this concern.[2]

Likewise, disposal in landfills, underground salt cavities and deep injection wells does not destroy POPs, but may result in wider contamination through groundwater migration and other processes. Also, such inappropriate practices may ultimately require expensive groundwater and soil remediation costing far more than properly destroying the POPs in the first place.

Non-incineration technologies: A range of POPs destruction technologies have been developed around the world over the last 20 years, which appear to overcome many of the inherent limitations of incineration and other combustion methods. These technologies generally use physical and chemical means of converting POPs waste to less harmful substances without the release of dioxins/furans and other hazardous POPs to the air, or in solid and liquid wastes. While not as widely known or promoted as incineration, some alternative technologies have demonstrated remarkably high destruction efficiencies for POPs and have a proven track record of commercial operation.

Non-Incineration Technology Fact Sheet #1

The U.S. Department of Energy have evaluated a range of non-incineration treatment technologies for the destruction of hazardous organic wastes, and note they have the potential to[3]:

- Destroy organic material without use of open-flame reactions with free gas-phase oxygen as the reaction mechanism.
- Reduce the offgas volume and associated contaminants emitted under normal operating conditions per unit mass of waste fed.
- Reduce the metals, radionuclides, and particulates suspended in the offgas exiting the process.
- Eliminate, or greatly reduce, the dioxin and furan precursors in the primary treatment process, especially in the offgas streams.
- Avoid conditions which allow free chlorine production and allow dioxin and furan precursors to form and to continue to react *de novo* with chlorine to produce dioxins and furans.

Technical Criteria for POPs Destruction Technologies: Non-incineration technologies therefore offer considerable promise as methods of disposing of POPs stockpiles in a manner which does not release or further disperse POPs into the wider environment. Greenpeace has reviewed a range of technologies for POPs stockpile destruction and in the process developed three primary technical criteria that are useful in assessing the performance of POPs destruction technologies:[4]

1. **Destruction efficiencies of effectively 100 percent for the chemicals of concern.** The determination of 100 percent destruction efficiency is necessarily based on findings of no detectable concentrations of the chemicals of concern in any and all residues, using the most sensitive analytical techniques available worldwide. Analyses of the unmodified 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 to air, water or land**.

Greenpeace also considers that community-based public participation must be an integral part of the entire process of assessing any POPs disposal project – starting with stockpile evaluation, site and technology selection and continuing through operation, monitoring and compliance.

Further Information: Details of particular non-incineration technologies is provided in the 1998 Greenpeace Report [4] and the other fact sheets in the Non-incineration Technology Fact Sheet series.

References

1. Federal Register, 40 CFR Part 372, Vol. 64, No. 209, Friday, October 29, **1999**,
2. Releases of Dioxins and Furans to Land and Water in Europe, Final Report produced for Landesumweltamt Nordrhein-Westfalen, Germany on behalf of European Commission DG Environment, September **1999**
3. W. E. Schwinkendorf, B. C. Musgrave, R. N. Drake, **1997**. Evaluation of Alternative Nonflame Technologies for Destruction of Hazardous Organic Waste, Report INEL/EXT-97-00123, Idaho National Engineering Laboratory, Mixed Waste Focus Area, Lockheed Martin Idaho Technologies Company, Idaho Falls, Idaho, April **1997**
4. Costner, P., Luscombe, D., and Simpson, M., Technical Criteria for the destruction of POPs Stockpiles, Greenpeace International, **1998**. Available at http://www.who.int/ifcs/isg3/d98-17b.htm