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International POPs Elimination Project

*Fostering Active and Efficient Civil Society Participation in
Preparation for Implementation of the Stockholm Convention*

Public Information and Awareness-Raising on Unintentionally Produced POPs from Medical Waste

**Pesticide Watch Group
Nepal Forum of Environmental Journalists**

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About the International POPs Elimination Project

On May 1, 2004, the International POPs Elimination Network (IPEN <http://www.ipen.org>) began a global NGO project called the International POPs Elimination Project (IPEP) in partnership with the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Program (UNEP). The Global Environment Facility (GEF) provided core funding for the project.

IPEP has three principal objectives:

- Encourage and enable NGOs in 40 developing and transitional countries to engage in activities that provide concrete and immediate contributions to country efforts in preparing for the implementation of the Stockholm Convention;
- Enhance the skills and knowledge of NGOs to help build their capacity as effective stakeholders in the Convention implementation process;
- Help establish regional and national NGO coordination and capacity in all regions of the world in support of longer term efforts to achieve chemical safety.

IPEP will support preparation of reports on country situation, hotspots, policy briefs, and regional activities. Three principal types of activities will be supported by IPEP: participation in the National Implementation Plan, training and awareness workshops, and public information and awareness campaigns.

For more information, please see <http://www.ipen.org>

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Public Information and Awareness Raising on Unintentionally Produced POPs

Executive Summary

Study Goal

The goal of the study is to estimate releases of unintentionally produced POPs such as polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans (PCDD/PCDF) from the hospital waste (medical waste) incinerators of Kathmandu valley to raise awareness among the Kathmandu valley people on the health effects of unintentionally released POPs (PCDD/PCDF) for their reduction/elimination in order to comply with the Article 5, Annex C of the Stockholm Convention on Persistent Organic Pollutants.

Project Activity

1. To accomplish the study goal, estimates on medical wastes generated in the hospitals of Kathmandu valley were obtained from the secondary literatures and survey of the hospitals. Policies, guidelines and legislations on the management of hospital wastes were collected, reviewed and discussed with the concerned hospital regulating and management authorities. On-site observations on the final disposal management of the hospital waste were undertaken. The volume of hospital wastes incinerated on daily basis was calculated for the Kathmandu valley. Using the UNEP Standardized Toolkit for the identification and quantification of Dioxin and Furan releases (2005) methodology, Toxic Equivalent (TEQ) values for PCDD/PCDF emissions against the weight of the incinerated hospital wastes was estimated for daily and annual releases in the Kathmandu valley.
2. With above database, awareness materials were prepared focusing on the vulnerability of the operational Medical Waste Incinerators in the Kathmandu valley on the releases of PCDD/PCDF and its implications for the health of the exposed population. The objectives of Stockholm Convention on Persistent Organic Pollutants, particularly PCDD/PCDF unintentional releases and the need for their elimination were highlighted in the context of Nepal. Various hospital waste management alternatives were discussed to influence policy and legal intervention for the elimination of unintentional releases of PCDD/PCDF from medical waste incinerators.

Study Findings

1. There were no specific policies on the waste till 1996. The Solid Waste Policy of 1996 only addresses Municipal Solid Waste (MSW) and recognized Health Care Institution (HCI) waste as a hazardous one. The policy, however, does not have exclusive mention of HCI waste management issues. The National Health Care Technology Strategy of Second Health Plan (1997-2017) for the first time realized the need of a functional guideline to manage HCI wastes at all levels, including the private sector.

2. The National Health Care Waste Management Guideline, 2002 was prepared by Nepal Health Research Council (NHRC) for the sound management of HCI wastes. It for the first time defined HCI wastes in compliance with the World Health Organization (WHO) definition. The guideline addresses strategic issues such as
 - Waste management, committees, plans and waste audits;
 - Waste minimization, avoidance, segregation, recycling, and reuse;
 - Waste labelling, and containment;
 - Proper waste handling;
 - Storage and transport;
 - Proper waste treatment and safe disposal
3. The National Health Care Waste Management Guidelines recognized thermal combustion processes such as Rotary kiln, Pyroclastic incinerators, Single chambered incinerators, and Drum and brick incinerators as among the best HCI waste treatment and disposal options. However, it recommends emission guidelines are equivalent to the US EPA emission guidelines for incinerators constructed after June 1996.
4. Kathmandu Metropolitan City (KMC), 2003, also prepared a HCI Wastes Management Guideline, which is identical with the National Health Care Waste Management Guideline 2002.
5. The Environmental Impact Assessment (EIA) of Medical Waste Management in KTM, 2003 prepared by KMC, has recommended a central Pyrolytic incinerator with a capacity of treating 100kg/hour for the treatment of health care institution wastes of Kathmandu Metropolitan City. Accordingly, an incinerator was installed at the city centre in 2004. Due to public opposition, KMC could not operate the incinerator even for a period of month. KMC is still trying to operate the incinerator in the pretext that it has been approved by the Ministry of Population and Environment (MOPE).
6. Private and Non-Governmental Health Institutions Establishment, Operation, Standards and Infrastructure Guidelines (2061) prepared by the Ministry of Health (MOH) stipulates that “any person or the organization willing to run a private health institution should compulsorily fulfil the infrastructural requirements and standards set by the MOH before operating such institutions”. The guideline requires that all the health institutions should manage their waste by themselves.
7. Out of the total hospitals (16) surveyed in Kathmandu valley during the study, 62% of the hospitals were found to practice combustion of hospital wastes either by incineration or by open burning within the hospital premises. Wide ranges of small batch type of one or two chambered incinerators (local made to imported) are used. None of the observed incinerators have temperature or other Air Pollution Control (APC) devices. Hospitals not practicing incineration or open burning of wastes dispose their wastes to the MSW containers. Even the hospitals practicing incineration or open burning of the wastes dispose their fly ash and bottom ash in the MSW containers.

8. Approximately 62% of the surveyed hospitals claim to segregate the hospital wastes at source into infectious wastes and non-infectious or general wastes. However, observations during survey revealed only 30% of the hospitals practice some kind of segregation, while rest does not practice segregation at all. Hospitals practicing waste segregation also do not strictly follow the segregation norms and often mix infectious wastes with the general wastes.
9. Data obtained on waste generation from the survey questionnaire from the hospital management/responsible person were alarmingly low. Obviously hospital management is not aware of the waste generation and on going management of generated waste. Hospital waste management is of low priority and there was least attention paid on the issue by hospital authorities as well as the government regulatory authorities.
10. To obtain hospital waste generation data, a rigorous survey was imminent. As this was not possible from the available study funds, the study made use of the data on waste generation from the earlier studies. The study conducted by ENPHO in 2003 was found to be appropriate and was used for waste generation rates in the hospitals of Kathmandu valley.
11. According to ENPHO (2003), there are more than 40 public and private hospitals within Kathmandu valley. The salient features on the waste generation rate as per the study are:
 - Total bed capacity of the Kathmandu valley hospitals = 3905 beds.
 - Bed occupancy rate = 70%.
 - Total waste generation rate (non-infectious and infectious) = 1.72 kg/bed/day
 - Non-infectious waste generation = 70.1% of total waste kg/bed/day
 - Infectious waste generation = 27.9% of total waste kg/bed/day
12. Taking the above data on hospital waste generation, hospital waste generation in Kathmandu valley is estimated as under:
 - Total hospital waste generation = 4.7ton/day,
 - Total non-infectious waste generation = 3.39 ton/day
 - Total infectious waste generation = 1.31 ton/day
13. Based on the sample survey of hospital waste on final disposal practices that 62% of the hospitals in Kathmandu valley perform either incineration or open burning of hospital wastes, following emission scenario, a) combustion of total hospital waste and b) combustion of infectious wastes only, of PCDD/PCDF were estimated applying UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan. As the UNEP toolkit does not recommend emission factors for open burning of the medical wastes, emission factors for the medical waste incineration classification 1 “Uncontrolled batch type combustion, no APCS” were used for PCDD/PCDF emission estimation even for open burning.

Type of Medical Waste	Waste Generation (ton / day)	Waste Incinerated or Burned Openly (62% of the total waste)	Emission * Factor, (µg TEQ / ton)		Emission of PCDD / PCDF, (µg TEQ /day)		Total PCDD / PCDF Generated, (µg TEQ / day) (A + B)	Total PCDD / PCDF Generated, (g TEQ / year)
			Air	Bottom Ash	Air (A)	Bottom ash (B)		
Total waste	4.70	2.914	40,000	200	116,560	582.8	117,143	42.8
Infectious waste only	1.31	0.812	40,000	200	32,488	162.4	32,650	11.9

Note: * Emission factors: UNEP Standardised Toolkit for the identification and Quantification of Dioxin and Furans for the Medical Wastes, Classification 1 “Uncontrolled batch type combustion, no APCs”

Conclusions and Recommendations

1. The PCDD/PCDF release potential from the incinerators or open burning of hospital wastes in the Kathmandu valley is alarming. The situation could be even more grim if the fate of wastes from all the HCI is accounted for. Bowl type topographic features of Kathmandu valley inhibits mixing and dilution of the PCDD/PCDF emission from their source of origin owing to stable and stagnant air conditions. Further, atmospheric inversion, observed during the winter season in the Kathmandu valley, exhibits its vulnerability to high PCDD/PCDF concentration at the ground level. Increasing vehicular population of all ages and types in the Kathmandu valley, the other source of PCDD/PCDF emissions, also increases accumulation potentials of PCDD/PCDF in the valley. As PCDD/PCDF has no lower limit of risk to human health, its implications for harm to a wider population, particularly children and the elderly are beyond speculation.
2. Considering the above constrained geographic conditions and unfavourable meteorological characteristics, technologies that have potentials of PCDD/PCDF releases need legal prohibition in the Kathmandu valley. In this context, thermal combustion of wastes including MSW incinerators, medical waste incinerators and open burning should be made punishable within the valley.
3. Hospitals should characterize waste streams and implement source segregation to give each stream the treatment it needs. Infectious waste may be treated with alternatives to incineration and open burning that do not generate POPs such as autoclaves, microwaves, and alkaline hydrolysis.
4. As a party to the Stockholm Convention on Persistent Organic Pollutants, Nepal, in the spirit of the Article 5, Annex C, should develop action plans to eliminate the sources of unintentional POPs such as PCDD/PCDF.
5. Formulation and implementation of policies, guidelines and legislation on the medical waste management that restricts releases of PCDD/PCDF and covering all issues from “cradle to grave” should be one of the agenda of Action Plan for the elimination of unintentional POPs.