



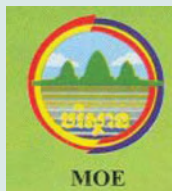
**Hatfield**  
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# Regional Capacity Building Program for Health Risk Management of Persistent Organic Pollutants (POPs) in South East Asia



Final Economic Valuation Report for  
Sambour EDC Warehouse Site, Cambodia

June 2009



Canadian International  
Development Agency

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**REGIONAL CAPACITY BUILDING PROGRAM  
FOR HEALTH RISK MANAGEMENT  
OF PERSISTENT ORGANIC POLLUTANTS (POPs)  
IN SOUTH EAST ASIA**

**ECONOMIC VALUATION REPORT FOR  
SAMBOUR EDC WAREHOUSE SITE, CAMBODIA**

**Final Report**

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**JUNE 2009**

POP1406.1



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## LIST OF ACRONYMS

<b>BCR</b>	Benefit Cost Ratio
<b>CBA</b>	Cost Benefit Analysis
<b>CEA</b>	Cost Effectiveness Analysis
<b>CIDA</b>	Canadian International Development Agency
<b>COPC</b>	Contaminants of Potential Concern
<b>DALY</b>	Disability Adjusted Life Year
<b>EDC</b>	Électricité du Cambodge
<b>GNI/capita</b>	Gross National Income per capita
<b>HPT</b>	Hatfield Project Team
<b>IRR</b>	Internal Rate of Return
<b>Lao PDR</b>	Lao People's Democratic Republic
<b>NPV</b>	Net Present Value
<b>PPP</b>	Purchasing Power Parity
<b>PV</b>	Present value
<b>MIME</b>	Ministry for Industry Mines and Energy
<b>MOE</b>	Ministry of Environment
<b>OECD</b>	Organization for Economic Cooperation and Development
<b>POPs</b>	Persistent Organic Pollutants
<b>POPs Project</b>	Regional Capacity Development Program for Management of Health Risks of Persistent Organic Pollutants in South East Asia
<b>SOE</b>	State Owned Enterprise
<b>VSL</b>	Value of a Statistical Life
<b>WTP</b>	Willingness-to-Pay

## ACKNOWLEDGEMENTS

Hatfield Consultants and the POPs Project Team express our sincere thanks to the many individuals who have played significant roles to date in the *Regional Capacity Development Program for Management of Health Risks of Persistent Organic Pollutants (POPs) in South East Asia* (hereafter referred to as the POPs Project).

Special thanks are due to the World Bank Project Task Team, including Dr. Jitendra (Jitu) Shah, Dr. Catalina Marulanda and Mr. Manuel Cocco, for their support and assistance with all aspects of project implementation. We also appreciate comments received on an earlier draft provided by Dr. Magda Lovei and Dr. Jan Bojo from the World Bank. We would also especially like to thank the Canadian International Development Agency's (CIDA) POPs Fund, for their financial support for the POPs Project.

We would like to especially thank all key MOE staff members, Mr. Heng Nareth, Ministry of Environment (MOE) Advisor, and Director of MOE Department of Environment Pollution Management and Control (MOE), Mr. Chen Sophanna and other participants from Electricite du Cambodge (EDC), and Mr. Roath Sith, National Consultant, for technical contributions and positive collaboration, which ultimately led to the success of the case study development and other project activities.

Our sincere thanks also go to all national counterpart staff, and relevant national agencies for their active support and invaluable contributions to the POPs Project. We especially thank the participants of the National Training Workshop Siem Reap, Cambodia January 19-21, 2009 for their valuable comments and suggestions on the risk management options for the Sambour EDC Workshop site.

The report was prepared by Ms. Nelly Maublanc and Mr. Dave Williams from the Hatfield POPs Project Team, with contribution and supervision by Mr. Thomas Boivin, POPs Project Manager and Mr. Sokhem Pech, POPs Project Assistant Manager.

## EXECUTIVE SUMMARY

The enclosed report for the *Regional Capacity Building Program for Health Risk Management of Persistent Organic Pollutants (POPs) in South East Asia* (POPs Project) provides an economic evaluation for the project case study in Cambodia – the Sambour EDC Warehouse site (hereafter “the SEDCW site”).

The SEDCW site in Sambour village, Phnom Penh, Cambodia has been used to collect, store and repair used electrical equipment, including capacitors and transformers since 1982. Contamination at the SEDCW site is caused primarily by the handling and storage of older transformers containing PCB-contaminated oil, and spillages associated with these activities. PCBs and other contaminants have migrated to the soil, sediments, water and biota around the site, and are known to enter the human population (verified through blood PCB analysis in a sub-sample of the population).

The overall goal of the economic analysis was: to develop and implement a simplified economic evaluation process to help decision-makers assess whether implementing risk management measures at POPs-contaminated sites represents a sound allocation of public resources; and, to assess whether the benefits expected from such mitigation measures would, at a minimum, cover the costs.

Conducting an economic analysis of the impact of POPs contaminants is a challenging process. While common sense suggests that there may be many benefits from a remediation effort, the cause-effect relationships that link the removal of POPs contaminants to the ensuing human health and environmental benefits are not scientifically established. Supporting data, especially site-specific information, tend to be scarce. Nonetheless, the application of accepted economic practices and the use of professional judgment enables us to make rough estimates and draw valuable conclusions in the limited data setting of the project.

Modifications to the standard Cost-Benefit Analysis (CBA) process were necessary to overcome the data limitations. A modified approach was developed which calculates the minimum health benefits required to cover the cost of implementing proposed risk management scenarios for POPs hotspots.

This modified approach included the following:

- The Disability Adjusted Life Years (DALY) approach was used for the valuation of human health benefits;
- The value of a DALY in Cambodia was estimated by using benefit transfer to convert the value of a DALY in the U.K. to the Cambodia situation;
- The number of DALYs at the hot spot sites were estimated based on the national DALY rates (per 100,000 people) calculated by the WHO and the number of potential receptors assessed by Hatfield during the risk assessment conducted at the SEDCW site; and



- The cost estimates for the risk management scenarios were based on a number of assumptions including engineering measures that have not been subject to detailed design, and unit prices determined through desktop study. The cost estimates may be refined in future when site-specific and nation-specific input parameters are available.

Three risk management scenarios have been proposed: Scenario 1 - Implementation, enforcement and monitoring of worker's health and safety and spill prevention measures; Scenario 2 - Scenario 1 plus containment of existing contamination; and, Scenario 3 - Scenario 1 plus disposal of existing contamination. The costs (present value) of implementing these scenarios are estimated to range between: US\$ 180,000 and US\$ 1,800,000.

Based on the economic analysis, the minimum benefits required to cover these costs are between 3.6 and 35.5 DALYs "saved" each year. In relative terms, these benefits represent a reduction of total DALYs among the population of between 0.6% and 6.4% per year.

The analysis concluded that the implementation of Scenario 1 is justified from an economic standpoint on the basis of quantified human health benefits alone. The justification of an investment in either Scenario 2 or Scenario 3 requires the inclusion of other environmental and land value benefits, the quantification of which was beyond the scope of this study.

Should the decision be made to proceed with risk management policies at the local and national level, attention and studies should focus on ensuring that the proposed measures are designed and implemented in a sound and cost-effective manner.

Finally, decision makers must also consider the fact that health improvement policy can be pursued regardless of the outcome of the economic assessment. Decision-makers may take into account other social, political and humanitarian factors when deciding on appropriate risk management for the SEDCW site. This is often the case in developed countries where uncertainty in the determination of costs and benefits cannot be used as an excuse for inaction or omission. Furthermore, there are moral and ethical reasons to insist on investments that improve human health on the grounds that it is in the public interest and, as a result, outside of any economic consideration.

## DISTRIBUTION LIST

The following individuals/firms have received this final document:

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POPs Tool kit	POPs Project	√