REPUBLIC OF LIBERIA

National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPs)

Environmental Protection Agency of Liberia

Monrovia, Liberia

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FOREWORD

The growing world-wide commitment to protect human health and the environment from dangerous chemicals has been a catalyst for action in many sectors in Liberia. Chemicals directly or indirectly affect every aspect of our lives and they can be both helpful and harmful. Due to the cross-sectoral nature of chemicals management and the interest of Liberia in this area, a well coordinated and integrated management approach at the national level may achieve maximum impact on the limited resources available. To galvanize the process, Liberia became a party to the Stockholm Convention on Persistent Organic Pollutants (POPs) on May 23, 2003.

This report presents Liberia's National Implementation Plan (NIP) that will form the basis for satisfying its first obligation under the Stockholm Convention. Co-ordinated and integrated approaches for the sound management of chemicals are also called for through Chapters 19 and 20 of Agenda 21, by the Intergovernmental Forum on Chemical Safety, (IFCS), the World Summit on Sustainable Development (WSSD) and more recently, Strategic Approach to International Chemicals Management (SAICM).

As a further reaffirmation of how much we recognize the importance of sound chemicals management, the government of Liberia created the Environmental Protection Agency (EPA) in 2003 in order to institutionalize environment management of which POPs management is an integral part.

Consequently, this document is meant to provide a flexible guidance to allow Liberia to address those areas considered of particular importance to national situations. It may also serve as a basis for collaborative programs with international organizations and bilateral donors. Therefore, I call on all Liberians, foreigners within our borders, the UN, other developmental partners and the private sector to work towards a sound chemically managed Liberian Society.

Eugene H. Shannon, P.H.D.
Minister of Lands, Mines & Energy/ Chairman Policy Council
of the Environmental Protection Agency of Liberia

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LIST OF ACRONYMS

ACS	American Colonization Society
AEL	Association of Environmental Lawyers
AGRHA	Action for Greater Harvest
ALEJ	Association of Liberian Environmental Journalist
APC	Air Pollution Control
ARI	Acute Respiratory Illness
ASP	African Stockpile Programme
BAP	Blessed Assurance Production
BMC	Bong Mines Company
CEEP	Center for Environmental Education and Protection
CHEMCAL	Chemical Control Association of Liberia
CIEN	Chemical Information Exchange Network
COP	Conference of the Parties
CTA	Chief Technical Advisor
CTAD	Cotton Tree Agriculture Development
CUC	Cuttington University College
DDT	1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane; d(ichloro)d(iphenyl)t(richloroethane)
DNA	Designated National Authority
EA	Enabling Activity
ECOWAS	Economic Community of West African States
EIA	Environmental Impact Assessment
EM	Executive Mansion
EMS	Environmental Management System
EPA	Environmental Protection Agency
EPD	Export Permit Declaration
ERADRO	Environmental Relief and Development Research Organization
ESTIS	Engineering, Science and Technology Information Service
EU	European Union
EUR or €	Euro, Currency of the European Union
FDA	Forestry Development Authority
FPCO	Firestone Rubber Plantation Company
FTP	Flomo Theatre Production
GEF	Global Environment Facility
GHS	Globally Harmonized System (of Classification and Labeling of Chemicals)
GINC	Global Information Network on Chemicals
GIS	Geographical Information Systems
GOL	Government of Liberia
HCB	Hexachlorobenzene
HQ	Headquarters
HSSE	Health, Security, Safety and Environment
ICM	Inter-Ministerial Coordination Mechanism
IGNU	Interim Government of National Unity
IPD	Import Permit Declaration
IPEN	International POPs Elimination Network

ISO	International Organization for Standardization
LAC	Liberia Agriculture Company
LBS	Liberia Broadcasting Service
LCDF	Liberia Community Development Foundation
LEC	Liberia Electricity Corporation
LIFE	Liberia Indigenous Forum for the Environment
LIMINCO	Liberia Mining Company
LMA	Liberia Marketing Association
LPRC	Liberia Petroleum Refining Corporation
LSI	Liberia Sanitation Incorporated
LURD	Liberia United for Reconstruction and Democracy
LWSC	Liberia Water and Sewer Corporation
MAP	Movie Artist Production
MARPOL	International Convention on the Prevention of Pollutants from Ships, London 1973
MCC	Monrovia City Corporation
MHSW	Ministry of Health and Social Welfare
MICAT	Ministry of Information, Culture and Tourism
MLME	Ministry of Lands, Mines, and Energy
MOA	Ministry of Agriculture
MOCI	Ministry of Commerce and Industry
MODEL	Movement for Democracy in Liberia
MOE	Ministry of Education
MOF	Ministry of Finance
MPEA	Ministry of Planning and Economic Affairs
NAAQS	National Ambient Air Quality Standard
NCCTF	National Chemical Control Task Force
NECOLIB	National Environmental Commission of Liberia
NGO	Non-governmental Organization
NIP	National Implementation Plan
NPC	National Project Coordinator/POPs Enabling Activities
NPFL	National Patriotic Front of Liberia
NPRAG	National Patriotic Reconstruction Assembly Government
NTGL	National Transitional Government of Liberia
PADS	Promoting Activities for Development and Sustenance
PCB	Polychlorinated biphenyl
PCDD	Polychlorinated dibenzo-p-dioxin
PCDF	Polychlorinated dibenzo furan
PIC	Prior Informed Consent (Rotterdam Convention)
PNC	POPs National (Steering) Committee
POCAL	Pollution Control Association of Liberia
POPs	Persistent Organic Pollutants
PRC	People Redemption Council
PRTR	Pollutant Release and Transfers Register
PTM	Phenyl tolyl methane
PVC	Polyvinyl chloride
PXE	Phenyl xylyl ethane
QMS	Quality Management System
RUF	Revolutionary United Front

SHE	Security Health Environment
SITC	Standard International Trade Classification of the United Nations
SOLF	Society of Liberian Foresters
TCDD	Tetrachlorodibenzo- p- dioxin
TDS	Talking Drum Studio
TEF	Toxic Equivalency Factor
TEQ	Toxic Equivalent Quantity
TNC	Transnational Corporation
TOR	Terms of Reference
UL	University of Liberia
ULIMO	United Liberation Movement of Liberia
UMU	United Methodist University
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nation Environment Programme
UNIDO	United Nations Industrial Development Organization
UPM	UNIDO Project Manager
UPOP	Unintentionally Produced Persistent Organic Pollutant
UR	UNIDO Representative
URFA	Union of Rural Farmers Association
USD or $	United States Dollar
WHO	World Health Organization

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We are equally thankful to Dr. Szabolcs Fejes, the UNIDO Consultant, who technically equipped the stakeholders with the requisite knowledge to complete the project. The project acknowledges the support of the EPA Executive Director, Dr. Fodee Kromah and the entire staff of the Agency.

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EXECUTIVE SUMMARY

The Stockholm Convention on Persistent Organic Pollutants (POPs) is the first global, legally binding instrument whose aim is to protect human health and the environment by controlling the production, use and disposal of toxic chemicals. As ratified, the Convention addresses a "dirty dozen" group of chemicals, those that stay in the environment for a long time, are poisonous, and accumulate in living organisms, posing an unacceptable threat to human health and the environment. The Convention establishes a science-based process for identifying and eliminating POPs worldwide. It also applies the "precautionary approach" by recognizing that it dose not require absolute, final proof that a chemical is doing harm before action on it is taken.

The Stockholm Convention on Persistent Organic Pollutants (POPs), to which Liberia acceded on May 23, 2002, requires all Parties to prepare a national implementation plan (NIP) in accordance with Article 7 as the basis for a national phase – out or reduction program and eventual elimination of POPs at the country and global levels.

In compliance thereof, the Government of Liberia (GOL) through the Environmental Protection Agency (EPA) in collaboration with the United Nations Industrial Development Organization (UNIDO) launched the POPs Enabling Activities Project to facilitate early action on the implementation of the Convention. The goal is to strengthen the country's capacity and capability to prepare the NIP for the management of POPs. The NIP will serve as the benchmark for crucial policy formulation and identification of priority actions.

To facilitate the NIP preparation process, an inception workshop was held on May 18–19, 2004 at the YMCA Auditorium, Crown Hill, Monrovia, which was attended by a number of experts, including Dr. Grace J. A. Ohayo-Mitoko, UNIDO POPs Program Manager.

The purpose of the inception workshop was, among other things, to raise awareness of POPs issues and the enabling activities project as well as to identify participants as potential task team members.

A training workshop was later held in Sinkor at a local hotel. Dr. Szabolcs Fejes, UNIDO Consultant, conducted the training in inventory procedures.

A one day workshop on National Priority Validation was again held at the Ministry of Gender and Development Hall. The principal objective of the workshop was to review and validate the various reports from the Expert Task Teams on POPs in Liberia. The specific objectives were to establish a list of national priorities on POPs related environment issues and their root causes; develop three objectives in relation to priority issues identified; identify capacities and needs of the Government to manage POPs; identify examples of available alternatives to POPs chemicals; identify Best Environmental Practices (BEP) and Best Available Techniques (BAT) to minimize release of POPs into the environment; develop a time frame and identify financial, technical and human resource needs.

Stakeholder Involvement

Stakeholder meetings were central to the development of the NIP process. There was wide representation and active participation from the public and private sectors, the NGO community and civil society. In particular, stakeholders contributed to the identification of the five national priority areas, and provided information and data for the development of the NIP.

The heavy reliance of the production sector of the economy (mining, agriculture and quarrying) on Liberia's national resources underscores the need to strategically manage the environment in order to ensure sustainability.

Liberia is a member of various regional and international organizations and is a party to a number of international conventions and treaties. The key regional organizations are the Mano River Union, ECOWAS and the African Union. Apart from acceding to the Stockholm Convention in May 2002, Liberia is also Party to the Rotterdam and Basel Conventions. Other related processes that Liberia is a part of are the strategic Approach to International Chemical Management, (SAICM) and the Intergovernmental Forum on Chemical Safety (IFCS) processes. Liberia has not produced legislation and regulation on POPs. Therefore, this is of prime importance.

Other relevant International Agreements and Commitment are listed in Annex 1.

Brief on Status of POPs in Liberia

Liberia has not manufactured any of the intentionally produced POPs.

PCBs

PCBs are mostly found in electrical equipment and transformers, capacitors and equipments using dielectric or hydraulic fluids. PCBs are banned in Liberia.

POPs Pesticides

All of the POPs pesticides are banned in Liberia but some are still being used illegally, such as DDT, dieldrin, and chlordane.

Dioxin, Furans and HCB are unintentionally formed as by-products in combustion processes. Releases to air are mainly generated by burning of open garbage, wood and charcoal, as well as fuel combustion in vehicles. Releases to water originate from leachate from dumpsites.

HCB emissions to air are also mainly caused from pesticide application and to water from sewage. HCB from emission from hospital sources are very small. There is no emission standard for HCB for incineration.

Summary of Future Production

The convention allows exemption for acceptable uses of certain POPs but Liberia has not made such request, even though DDT is still being used illegally.

Existing Programs for Monitoring of Releases, Environmental and Human Health Impacts

Presently, there are no programs to monitor levels of POPs chemicals in the environment, There have been no studies on bioaccumulation of pesticides in the food chain.

Information, Awareness and Education

The level of awareness of the dangers of POPs has not been determined at this stage, although an information mechanism has been established within the project secretariat. However, there are high levels of commitments to POPs and pesticides management issues from stakeholders.

Relevant Activities of NGOs

The participation of NGOs to the NIP process has been very important. Some of their members are in the Steering Committee and some in the expert Task Teams.

Overview of Technical Infrastructure

Sampling and analysis is virtually not done as the resources and skilled staff are lacking. There is not one laboratory equipped to analyze environmental and other samples. There is currently no capability to conduct environmental sampling for dioxin and furans, as well as PCBs and pesticides. Hence, the staffs of the EPA and other chemical experts need training and the laboratories need to be upgraded.

Resources for Program Implementation

Implementation of the NIP will require additional human and technical resources for the aspects of monitoring, enforcing, information dissemination, public education, assessment and reporting functions at the EPA and the ICM. The required resources are lacking.

Disposal Facilities

Presently, there are no safe facilities for hazardous waste disposal. The only possibility for now is to destroy these wastes and obsolete chemicals in cement kilns or to store them.

Identification of Impacted Populations or Environments and Threats to Public Health and Environmental Quality

No exposure data for POPs have ever been recorded in Liberia. Measurements of POPs and pesticides levels have not been taken and therefore the levels of contamination are unknown.

Systems for Assessment and Listing of new Chemicals

Importation of pesticides is regulated by the MOA, and the MOH regulates the importation of certain chemicals. The effective tracking of other imported chemicals

by MOCI is difficult because of the lack of capacity. The system needs to be upgraded.

Strategy and Action Plan Elements

The complete documentation of the strategies and action plan elements can be found in Annex 6 of the document.

The policy statement recognizes the risk posed by the POPs chemicals. The strategies and activities for implementing the management of POPs are based on the risk assessment approach and guided by the precautionary principle.

"Community's Right to Know" notion will be fully incorporated as an information tool. The "Polluters Pay" principle will be fully applied in consonance with the environmental policy of Liberia.

Goals: Elimination of the risk to human health; avoiding the importation of unwanted POPs and other hazardous materials; establishing suitable storage and disposal sites; upgrading and management of all contaminated sites will be addressed by 2010. Incremental cost and time table will be allowed to accommodate the 2020 World Summit on Sustainable Development Goals.

Action Plan

The following is a summary of the activities needed to implement the plan.

Institutional, Policy and Regulatory Strengthening Measures

- Select a strategy for regulating PCBs
- Update regulations to include standards for POPs (and other) pesticides in drinking water
- Develop regulations for hazardous chemicals management including storage of pesticides and PCBs
- Produce a medical waste policy
- Develop a plan for reducing trash burning including provision of alternatives in areas not served by garbage collection, and develop complementary public education and awareness programs
- Ensure integration of PCB management with the Hazardous Materials and Hazardous Waste Policy

Disposal of Stockpiles of POPs Pesticides

- Establish secured storage sites for POPs, pesticides and other unwanted or obsolete chemicals
- Establish a database for stocks of pesticides

- Destroy stocks of POPs and unwanted or unidentified pesticides
- Commence the identification, labeling, storage and disposal of PCBs and PCB containing equipment
- Establish secured PCB storage sites
- Eliminate PCBs in electricity transmission system

Reduce or Eliminate Unintentional Releases of Dioxin, Furans and HCB

- Provide viable alternative disposal means and ban trash burning in urban areas
- Implement the medical waste policy when available, including closure of devices in which hospital waste is burned inappropriately and implementing alternate disposal methods for hospital and other medical waste

Plan for Assessment and Mitigation of Releases from Stockpiles and Waste

- Conduct monitoring programs at potentially contaminated sites
- Identify and manage contaminated sites

Strategy for Information Exchange, Public Awareness, Training and Education

- Develop plans for outreach and public education & training
- Develop strategies for tracking changes in public behavior
- Review and update various curricula and introduce POPs related training courses as needed

Monitoring and Reporting

- Establish sampling and analytical capabilities for dioxins and furans
- Conduct research monitoring programs (PCBs, pesticides and dioxins and furans in various environmental media (air, freshwater, sediments, soil, floods)
- Measure the implementation process of the NIP periodically against the performance indicators

Preliminary Cost Estimates to Implement the NIP for POPs (2006-2010)

No	Area of Focus	US$
1	Governance/Legal	645,000
2	Risk Reduction/Health	35,000
3	Capacity Building, Technical Cooperation, Education and Awareness	863,000
4	Assessment of the POPs Situation and POPs Inventories	322,000
5	Remediation	850,000
6	Research, Monitoring and Reporting	250,000
7	Resource Mobilization	36,000
TOTAL		3,001,000

1. INTRODUCTION

Aware that persistent organic pollutants (POPs) pose major and increasing threats to human health and the environment, in May 1995 the Governing Council of the United Nations Environment Programme (UNEP) requested in its decision 18/32 that an international assessment process be undertaken of an initial list of 12 POPs (aldrin, chlordane, DDT, dieldrin, dioxins, endrin, furans, hexachlorobenzene, heptachlor, mirex, PCBs, and toxaphene) and that the Intergovernmental Forum on Chemical Safety (IFCS) develop recommendations on international regulations and actions for consideration by the UNEP Governing Council and World Health Assembly not later than in 1997.

In June 1996, the IFCS concluded that available information was sufficient to demonstrate that international action, including a global legally binding instrument, is required to reduce the risks to human health and the environment arising from the release of the 12 POPs. The IFCS provided recommendations to UNEP that served as a basis for the mandate to begin negotiation of a global POPs Convention.

In February 1997, the UNEP Governing Council in its decision 19/13c invited UNEP to prepare for and convene an intergovernmental negotiating committee (INC), with a mandate to prepare an international legally binding instrument for international action beginning with the 12 POPs and requested that the INC establish an expert group to develop criteria and a procedure for identifying additional POPs as candidates for future international action. The decision also included a number of immediate measures to address POPs.

The first meeting of the INC to develop an international legally binding instrument for implementing international action on certain POPs was held in June 1998 in Montreal, Canada at which the Criteria Expert Group (CEG) requested above was established. Subsequent meetings of the INC were held and the negotiations successfully completed. The CEG completed its mandate in meetings: the first in Bangkok, Thailand, in October 1998 and, the second, in Vienna, Austria, in June 1999. A meeting of 18 countries designated by the INC on financial resources and mechanism was held in Vevey, Switzerland, in June 2000 that helped lay the groundwork for consensus on these issues at the final negotiating session.

The Convention was adopted and opened for signature at a Conference of Plenipotentiaries held from 22 to 23 May 2001 in Stockholm, Sweden. It was signed at a ceremony on 23 May 2001 by 92 States and the European Community. The Stockholm Convention focuses on eliminating or reducing releases of the above mentioned 12 POPs, otherwise called “dirty dozen”. The Convention entered into force in 2004, signed by over 150 countries. Liberia became a party to the convention on May 23, 2002.

The 15th GEF Council included UNIDO among the executing agencies under the expanded opportunities for implementing GEF projects. In 2001, UNIDO became a member of the GEF inter-Agency Task Force on POPs. According to the decision of the 17th GEF Council meeting held in Stockholm, UNIDO has the mandate to submit Enabling Activities Projects to GEF for sponsorship.

Article 7 of the Stockholm Convention requires the Parties to prepare National Implementation Plans (NIPs) and assess their countries' capacity. The NIP will also form the basis for a phase out/reduction program and ultimate elimination of POPs at the country and global levels. UNIDO is the GEF implementing agency for the POPs Enabling Activities in Liberia. Liberia's project started on January 22, 2004 and the duration is two (2) years with an estimated contract price of US$257,000.

General information on POPs

Table : POP Pesticides

	Description
DDT	Insecticide used on agricultural crops, especially cotton, and insects that carry diseases like malaria and typhus. DDT is still widely used in developing countries mainly for mosquito control and also for the production of Dicofol.
Aldrin and Dieldrin	Insecticides used for crops like corn and cotton. Also used for termite control.
Chlordane	Broad spectrum contact insecticide used on agricultural crops including vegetables, small grains, maize, other oilseeds, potatoes, sugarcane, sugar beets, fruits, nuts, citrus, cotton, and jute. Used on home lawns and gardens. Also used for termite control.
Endrin	Insecticide used mainly on field crops such as cotton and grains. Used as a rodenticide to control mice and voles. Also used to combat birds.
Heptachlor	Stomach and contact insecticide, used primarily against soil insects and termites. Also used against cotton insects, grasshoppers, some crop pests, and to combat malaria.
Hexachlorobenzene (HCB)	Fungicide used for seed treatment of wheat, onions, and sorghum. Also found as impurity in several pesticide formulations. Also found as an industrial by-product.
Mirex	Stomach insecticide used to combat fire ants and leaf cutters, harvester termite, meanly bug, and yellow jacket wasps. Also used by a fire retardant in plastics, rubber, and electrical goods.
Toxaphene	A mixture of more than hundreds of chemicals and an insecticide primarily used to control insect pests on cotton and other crops. Used to control insects pests on livestock and to kill unwanted fish in lakes

Polychlorinated biphenyls (PCBs)

Major emission sources of PCBs are: certain high temperature industrial processes such as pyrogeneous emission from the combustion of fossil fuels, waste incineration, road transport, and crude steel production.

PCBs are used in synchronous condensers and capacitors as a good dielectric fluid, in transformers as unburnable heat exchanger, for lubrication and hydraulic oils, in impregnators, as an insulator liquid and as refrigeration liquid.

By-products: PCDD/PCDFs (polychlorinated dibenzo-p-dioxins, dibenzofurans) and hexachlorobenzen (HCB)

PCDD/Fs have never been produced intentionally. They are formed as by-products of numerous industrial activities and combustion processes. Almost all of the 210 individual congeners have been identified in emission from thermal and industrial processes, and consequently PCDD/Fs are found as mixture of individual congeners in environmental matrices such as soil, sediments, air and plants and lower animals. PCDD/Fs, particularly the higher chlorinated, are poorly soluble in water, have low volatility, and adsorb strongly to particles and surfaces. Thus PCDD/Fs are only found in minute concentration of water and are largely immobile once absorbed to soil. They bio-accumulate in the fatty tissues of animals and humans.

Major possible sources of dioxins and furans are waste incineration, thermal metallurgical processes, power plant combustion of fossil fuel, residential combustion and firing of wood and coal at households, specific chemical processes releasing intermediates, PCB based transformers and electric arc furnaces.

Primary sources of environmental contamination with PCDD/Fs in the past were due to the production and use of chloroorganic chemicals, including in the pulp and paper industry. PCDFs were/are formed as inadvertent by-products in the production and use of polychlorinated biphenyls (PCBs) and, in combination with PCDDs, in the production of chlorophenols, and have been detected as contaminants in these products. PCDFs can also be found in residual waste from the production of vinyl chloride and the chloralkali process for chlorine production. Factors favorable for the formation of PCDD/Fs are high temperatures, alkaline media, presence of UV-light, and the presence of radicals in the reaction mixture/chemical process.

Major sources of hexachlorobenzene (HCB) are similar to those of dioxin and furans It is formed as a by-product during the manufacture of chemicals used as solvents (substances used to dissolve other substances), other chlorine-containing compounds, and pesticides. Small amounts of hexachlorobenzene can also be produced during combustion processes such as burning of municipal waste. It may also be produced as a by-product in waste streams of chlor-alkali and wood preserving plants.

Project Management and Implementation

The Environmental Protection Agency of Liberia is charged with the protection of the environment, the coordination of the action of the various institutions in this field, and the preparation and supervision of relevant legislation. It is also responsible for national implementation of actions required under international environmental agreements. It is the executing agency for the proposed Enabling Activities and requested UNIDO's assistance in submitting its proposals to the GEF.

Upon approval of the proposal, UNIDO and the EPA agreed on a subcontract for the national administration of the enabling activities.

Under the terms of this subcontract, the Agency will, inter alia:

- Call principal stakeholders to form a POPs National Committee (PNC) to oversee and coordinate the successful implementation of the Enabling Activities and to lobby high-level commitment to the objectives of the Stockholm Convention;

- Establish a national project office within the EPA charged with the responsibility to successfully implement the Enabling Activities;

- Appoint a National Project Coordinator (NPC) with day-to-day responsibility for the management and coordination of the Enabling Activities and reporting to the PNC;

- Agree with UNIDO the appointment of a Chief Technical Advisor (CTA) and other international experts as might be required to build national capacities to ensure the successful preparation of the NIP.

The PNC will

- Have meetings on a regular basis;

- Agree on working arrangements and implementation plans with the NPC and executing agency;

- Lead stakeholder workshops to develop consensus and commitment to NIP objectives and plans.

The NPC will

- Have day-to-day responsibility for the management and coordination of the enabling activities, including subcontract budgets, and reporting to the PNC;

- Appoint national experts as necessary to undertake the various studies required during the course of the project using terms of reference agreed by the PNC and ensure the quality of their work;

- Provide a secretariat to function at the PNC and stakeholders workshops;

- Provide a focal point for information about the implementation of the enabling activities and serve as a publicly accessible National Information Center on POPs;

- Report regularly to the PNC, to the executing agency, and to the UNIDO appointed CTA the progress of the project and the disbursement of project funds.

The CTA will

- Supervise the development of the NIP in Liberia, working in close cooperation with the NPC, using his experience as CTA for other Enabling Activities project implementation by UNIDO in the region and reporting to UNIDO;
- Ensure that there is an exchange of experience and expertise between countries of the region;
- Ensure national awareness of regional initiatives on POPs, such as the Africa Stockpile Programme (ASP).

UNIDO will

- Appoint a CTA;
- Upon request of the EPA, appoint international experts, whenever possible drawn from the region, for specific project tasks;
- Monitor project execution by means of quarterly progress reports and close contact with the CTA;
- Organize a mid-term evaluation in line with GEF guidelines at the end of the year;
- Evaluate the efficiency of the project management, including outcomes, the budget and timelines.

Project Description

1.1.1 Background

Seven years of civil strife were brought to a close in 1996 when free and open presidential legislative elections were held. The years of fighting coupled with the flight of most businesses have disrupted formal economic activity. The unsettled domestic security situation has slowed down the process of rebuilding the social and economic structure of this war-torn country. Richly endowed with water, mineral resources, forest, and a climate favorable to agriculture, Liberia had been a producer and exporter of basic products, while local manufacturing, mainly foreign owned, had been small in scope. Nowadays, farming remains limited to a few areas.

Most of the foreign earnings of the country rely on the maritime registry and the timber industry. The totality of electricity for domestic and industrial use is generated from petroleum products.

Due to the outbreak of another war, Liberia was delayed in signing International Conventions. Of relevance to POPs issues, Liberia has however signed the MARPOL Convention on Maritime Pollution and the Stockholm Convention on POPs. This shows the commitment of the Government to protect human health and the environment from hazardous chemicals. Concerning POPs, the following issues have to be addressed as a priority:

- The lack of capacity to monitor and control the trade, use, management and disposal of POPs;

- The lack of awareness of the health and ecological impact of POPs amongst users, decision makers and the general population;

- The lack of information on existing alternatives for POPs

Liberia has not produced a national chemicals profile that collates chemicals-related data in a single document. Although the import of POPs pesticides was banned since 2000, a majority of these chemicals or contaminants were used in the past. Therefore, the existence of obsolete stockpile and the presence of POPs contaminated sites cannot be ruled out.

PCBs utilization has been restricted since 1996 but some older electrical equipment containing PCBs remained in use, even though the extent has not been recorded.

2. PROJECT OBJECTIVE

The overall objective of the proposed Enabling Activities is to strengthen national capacity and capability to prepare a National Implementation Plan (NIP) for the management of POPs. This plan will provide basic and essential levels of information to enable policy and strategic decisions to be made. It will also identify priority activities that Liberia should undertake in order to meet the requirements of the Stockholm Convention. It will be endorsed by all stakeholders prior to its transmission to the Conference of Parties.

In the immediate and long term the project seeks to

- Allow Liberia to meet its reporting obligation under the Stockholm Convention;
- Identify the main locations where POPs are emitted and used;
- Assess knowledge, attitude and practices of industry and the general public with regards to POPs handling, storage and application;
- Identify main uses and quantities of POPs, which have not yet been prohibited, and develop alternatives (e.g., waste transformer oils);
- Intensify efforts in the education of POPs users and the general public on POPs, and facilitate the identification of alternative chemicals (substitutes);
- Strengthen national capacity to manage POPs in particular and chemicals in general;
- Produce a National Implementation Plan (NIP) for Liberia

3. COUNTRY BASELINE

State of Knowledge of POPs

Country-specific information on POPs

Like the majority of African countries, Liberia faces very serious problems with POPs management, namely:

- No nation-wide inventory completed on POPs
- Lack of specific legislation on POPs
- Lack of information at the political and public level on the hazards of POPs

Production, distribution, use, export, and import procedures of POPs

Liberia does not produce or formulate any of the intentionally produced POPs. Other sources of POPs containing products are therefore important.

Quantitative information regarding previous utilization of POPs in Liberia is extremely hard to find. Documents from the different ministries indicate that DDT and dieldrin are still in Liberia. The following table summarizes the status of POPs chemicals in Liberia.

Table : Status of POPs in Liberia

Name of chemicals	Status of POPs in Liberia
Aldrin Endrin Chlordane Dieldrin DDT Heptachlor Mirex Toxaphene Hexachlorobenzen	Never produced in the country. Importation banned in 2000 but DDT and dieldrin are still in use in Liberia. Chlordane is reportedly been used but has not been confirmed.
PCBs	Possibly found in existing electric transformers. Restriction on imports since 1996.
PCDD/PCDFs	There is limited information on release into the environment. No inventories and measurements on emission have ever been conducted, though restrictions have been in place since 1999.

PCBs are currently used by the oxygen gas industry and are also found in old electric transformers. There is no reliable information on the quantities and handling of PCBs.

Detailed information on stocks, contamination sites and disposal opportunities

POPs use in Liberia

According to experts from EPA, significant obsolete PCB stocks can be found at some sites of the Liberia Electricity Corporation (LEC). Due to the importance of the mining industry in the country, where mines usually produce their own power, the existence of PCB-containing transformers on mine sites is likely.

Detailed surveys for stocks of obsolete pesticides and site contamination by POPs-containing products have not been carried out and are a priority of the Government.

Contaminated sites

No contaminated site has been confirmed. However, due to the lack of awareness and control, it can be assumed that environmental contamination did occur. During the civil war, there were reports on the destruction of electrical transformers and military facilities, which can be sources of environmental contamination.

Assessment of waste disposal opportunities

Waste management policy, control and practice have not been developed in Liberia. Land filling practices are uncontrolled, and there are no proper facilities for disposing of wastes. Burning household waste in backyards is a common practice.

Hazardous waste management

Similarly, hazardous waste management has not been developed and there is no information on the magnitude of the problem. Medical wastes are sometimes disposed of in open areas, and due to the lack of public awareness this causes health problems in the affected communities.

Alternative technologies

Presently there are no good alternative non-combustion technologies for POPs management in the country. The existing ones are not too effective and they do not meet international standards.

Detailed information on releases to the environment

POPs by-products/emissions have not been effectively monitored and no adequate inventories of their releases have been established. Currently there is no sufficient information available to ascertain the extent of the problem and the country also lacks the expertise to properly compile inventories. Because of bad road infrastructure and lack of security many sites are not accessible.

Legislation

The current legislation does not specifically address POPs. Although laws exist, the regulatory and control mechanisms for POPs are not included. Chemicals related issues are not also properly addressed. The war and the unstable political situation compounded the problem.

Pollutant Release and Transfer Register (PRTR)

At the moment, there is no Pollutant Release and Transfer Register in Liberia.

Monitoring of POPs

No adequate POPs monitoring has been undertaken in Liberia.

Human Health assessment of POPs

There has been no adequate human health assessment in Liberia.

Country Profile

3.1.1 Country History and Political setting

In the past the country was almost entirely covered with forest except for about 100 square miles in the north, which now forms part of the Guinea Savanna.

Freed Negro slaves backed by a philanthropic organization, the American Colonization Society (ACS) of the United States, founded Liberia in 1822. The word Liberia comes from the Latin word *liber*, which means free. Liberia is meant to be the "land of the free". Upon arrival, the repatriating slaves established the settlement Christopolis, now Monrovia. Monrovia was named after the Fifth President of the United States of America, James Monroe, on February 6, 1820.

The first Governor was Thomas Buchanan, and Joseph Jenkins Roberts became the second Governor. Under Roberts the Country gained independence on July 26, 1847. Roberts, born in Norfolk Virginia, United States of America, became the first President. Due to the influence of Roberts and other members of the American Colonization Society, the Constitution, flag, language and administrative structure are modeled after those of the United States of America.

In 1922, the American businessmen Harvey Firestone and Charles Goodyear found Liberia an ideal location for the cultivation of rubber. In 1926 an agreement was signed between the Government of Liberia and the Firestone Plantation Company.

In 1944, William V.S. Tubman was elected President of Liberia. During his era he introduced the Unification Policy in order to bridge the gap between the Americo-Liberians and the indigenes. Suffrage, for the first time in the history of Liberia, was extended to the Liberian women and the indigenous population. Tubman assumed the leadership of Liberia during World War II. The war brought an increased demand for rubber and heightened US interest in the construction of the Port of Monrovia and Roberts International Airport (RIA). Roberts International Airport was used as air base during the war.

William R. Tolbert succeeded William Tubman, who died of natural causes in 1971. President Tolbert's administration is credited as the 'golden age' for Liberia. Tolbert re-**i**ntroduced multi-party democracy, which was abolished by Tubman, making the True Whig Party the only party for several decades.

In 1980 the True Whig Party Government was violently overthrown in a military coup led by junior non-commission officers of the Armed Forces of Liberia. The Government was named "People's Redemption Council (PRC)", led by Master Sergeant Samuel K. Doe. President William R. Tolbert and mostly senior members of the Americo-Liberian descent were executed during the coup. The coming to power of the PRC marked the end of the first Republic.

Doe ruled for a little over ten years, and was assassinated in 1990 during the rebel incursion launched by Charles Taylor's National Patriotic Front of Liberia (NPFL). In October 1990, the Economic Community of West African States (ECOWAS) convened a meeting in the Gambia and invited the Liberian Government, political parties, National Patriotic Front of Liberia, Independent National Patriotic Front of Liberia and the Interfaith Mediation Committee of Liberia. Dr. Amos C. Sawyer was selected as head of the Interim Government of National Unity (IGNU), and Charles Taylor was selected as speaker of the Assembly.

Taylor refused to work with the interim government, insisting that he should head the government, since he controlled a greater portion of Liberia. He later formed his own government and named it the National Patriotic Reconstruction Assembly Government (NPRAG) with headquarters in the central administrative city of Gbarnga, Bong County.

Taylor's refusal to become part of the interim government and the continuation of the war led to the formation of several warring factions, namely: United Liberation Movement of Liberia (ULIMO-J and ULIMO-K), Liberia Peace Council and Lofa Defense Force. After a series of battles with the newly created warring factions, Taylor finally bowed down to a peace agreement, which was carved in the Nigerian capital of Abuja in 1996. The Peace Agreement led to the formation of a six-man Council of State, with Taylor as part of the collective Presidency.

In July 1997, a hastily arranged election was organized by the Economic Community of West African States (ECOWAS) with assistance from the United Nations, the United States Government and the Organization of African Unity (now the African Union). Charles Taylor's National Patriotic Party won the elections.

In 2000, a new wave of rebellion started along the border with neighboring Guinea, led by the Liberians United for Reconstruction and Democracy (LURD) mainly comprising members of nearly all the groups that fought with the various warring factions before the elections. In early 2003, another rebel group, Movement for Democracy in Liberia (MODEL) launched another rebellion from the border of Côte d'Ivoire. This amounted to two fronts being created by LURD and MODEL in a bid to oust the Taylor regime.

The conflict came to an end on August 4, 2003 when a vanguard ECOWAS force, ECOMIL arrived to secure the capital, Monrovia. This was to secure a peaceful transition of power from Taylor to Moses Blah. International pressures coupled with rebel demands urged Taylor to step down. During a hurriedly arranged convention attended by some African leaders, he did step down and went into exile in Nigeria. Moses Blah, the number two man in the Taylor government, took over the mantle of leadership in a transitional power sharing peace agreement that was reached by the Government of Liberia, Movement for Democracy in Liberia (MODEL), Liberia

United Reconciliation and Democracy (LURD), political parties and civil society leaders in the Ghanaian capital Accra on the 18th August 2003. On October 1, 2003, ECOMIL was replaced with a UN peacekeeping force, UNMIL, which had the mandate to help the transitional government implement the Accra Peace Accord.

On October 14, 2003, Blah handed authority to Charles Gyude Bryant, a Liberian Businessman, as Chairman of the National Transitional Government of Liberia (NTGL), to oversee the Country towards elections in 2005, which was won by Mrs.Ellen Johnson Sirleaf.

3.1.2 Geography and Population

Table : Country Date (from World Fact Book 2006)

Capital:	Monrovia
Area:	111,370 sq km
Land boundaries:	1,585 km (Guinea 563 km, Cote d'Ivoire 716 km, Sierra Leone 306 km)
Coastline:	579 km
Climate:	tropical; hot, humid; dry winters with hot days and cool to cold nights; wet, cloudy summers with frequent heavy showers
Terrain:	mostly flat to rolling coastal plains rising to rolling plateau and low mountains in northeast
Elevation:	*lowest point:* Atlantic Ocean 0 m, *highest point:* Mount Wuteve 1,380 m
Resources:	iron ore, timber, diamonds, gold, hydropower
Land use:	*arable land:* 3.43%, *permanent crops:* 1.98%; *other:* 94.59% (2005)
Irrigated land:	30 sq km (1998 est.)
Natural hazards:	dust-laden harmattan winds blow from the Sahara (December to March)
Environment - current issues:	tropical rain forest deforestation; soil erosion; loss of biodiversity; pollution of coastal waters from oil residue and raw sewage
Geography - note:	facing the Atlantic Ocean, the coastline is characterized by lagoons, mangrove swamps, and river-deposited sandbars; the inland grassy plateau supports limited agriculture
Population:	3,042,004 (July 2006 est.)
Age structure:	*0-14 years:* 43.1 %, *15-64 years:* 54.2 %, *65 years and over:* 2.8 % (2006 est.)
Growth rate:	4.91 % (2006 est.)
Infant mortality:	155.76 deaths/1,000 live births (2006 est.)
Life expectancy:	*total population:* 39.65 years - *female:* 41.35 years *male:* 37.99 years (2006 est.)
Total fertility:	6.02 children born/woman (2006 est.)
Ethnic groups:	indigenous African tribes 95% (including Kpelle, Bassa, Gio, Kru, Grebo, Mano, Krahn, Gola, Gbandi, Loma, Kissi, Vai, Dei, Bella, Mandingo, and Mende), Americo-Liberians 2.5% (descendants of immigrants from the US who had been slaves), Congo People 2.5% (descendants of immigrants from the Caribbean who had been slaves)
Religions:	indigenous beliefs 40%, Christian 40%, Muslim 20%
Languages:	English 20% (official), some 20 ethnic group languages, of which a few can be written and are used in correspondence
Literacy:	*definition:* age 15 and over can read and write *total population:* 57.5 % - *male: 73.3* %, *female:* 41.6% (2003 est.)
Independence:	26 July 1847
GDP:	purchasing power parity - $ 2.598 billion (2005 est.)
GDP real growth:	8 % (2005 est.)
GDP - per capita:	purchasing power parity - $900 (2005 est.)
GDP composition:	*agriculture:* 76.9 %, *industry:* 5.4 %, *services:* 17.7 % (2002 est.)

Situation and Delimitation

The Republic of Liberia is situated on the southwest corner of the West Coast of Africa between longitude 7 30’ and 11 30’ west and latitude 4 18’ and 8 30’ north. It

covers a surface of about 111,370 km (about 43,506 square miles). The dry land extent is 96,160 km^2 or 37,570 sq. miles. Liberia is bordered on the west by Sierra Leone, on the north by Guinea, on the east by Côte d'Ivoire and on the south by the Atlantic Ocean.

There are four topographical regions with each having its own distinct physical features and height above sea level. Along the Sea Coast is the Coastal Plain of 350 miles (560 km), an almost unbroken sand strip, which starts from the lowest elevation up to 30 meters above sea level.

Next to the Coastal Plain is the Belt of undulated plateaus followed by the Belt of high lands and rolling hills in the north and northwest. The highest elevation is the northern highlands, which includes Mount Wutivi (1,350 meter), the maximum elevation in Liberia.

Table : General Stratography of Rocks

Tectonic Period	Type of Rock	Age (million years)
Liberian Age	Metamorphic and igneous rocks	2,500-3,000
Eburnean Age	Metamorphic and igneous rocks	2,150+100
Pan-African Age	Metamorphic and igneous rocks	600+100
Post Pre-Cambrian	Unmetamorphosed sedimentary rocks and igneous intrusive	Less than 600

The rocks of Liberian Age extend into neighboring Sierra Leone, Guinea, and Côte d'Ivoire and are predominately highly foliated granitic gneiss, exhibiting a regional foliation and structural alignment in a northeasterly direction.

Rocks found in Liberia have been of economic importance and should continue to be in the future. Crystalline rocks (igneous and metamorphic) are used locally in the construction industry as roadbed materials and as foundation stones in building construction. Post-precambrian rocks are used in the building industry where beach and river sands form the major constitutions in the manufacture of concrete blocks.

Coastline and Maritime Claims

The Liberian coast is pounded by powerful surf, which has produced a relatively straight coastline with many lagoons. The coastline is 350 miles long (560km), characterized by an unbroken sand strip. The width of the coastal plain varies from 16-40 km and most of its land mass has an elevation of 9-30m. Most rivers flow slowly over the plain in large meanders and then widen near their estuaries. The territorial water is about 159,200 km^2 (70,000 sq. miles), which is larger than the land area of the country.

Relief and Soils

Several physiographical zones that roughly run parallel to the coastline characterize the relief of Liberia, which gains altitude gradually north away from the coast. These are respectively: the coastal plains, the rolling hills; the plateaux and mountains ranges and the northern highlands.

The plateaux and mountain ranges are behind the rolling hills. The plateaux reach heights up to 30 m and the mountain ranges up to 600 m. Important ranges are the Mano River Mountain, the Bea, Bong, Gibi, Kpo, Putu, and Tienpo ranges. The greatest width of this zone is about 130 km between the Lofa and St. Paul Rivers. Within this area farming dominates the different forms of causes for biodiversity loss, as lots of pesticides are herbicides are used. Logging is slightly hindered by relief in the eastern part of the country. Exploitation of forest is more difficult in central and upper Lofa County, however, because of topographic conditions. The northern highland zone is situated in Upper Lofa and Nimba Counties and comprises the Wologisi range with a height of 1,350 m and the Nimba range with an elevation of 1,385 m on the Liberian side, as the mountain is shared by Côte d'Ivoire, Guinea and Liberia.

Generally, three types of soil types can be distinguished in Liberia, the Lateritic soils or latosols, Sand soil or Regosols and Swamp soil. The Lateritic soils cover about 75% of the country. They are reddish-brown in color and quite hard. The soils have been classified into seven types, named after places of occurrence, such as Kakata, Suakoko and Voinjama. They are very acidic and lacking in nitrogen. Thus, continuous farming in these areas requires the constant use of chemical fertilizers. However, Latosols are more productive for agriculture purposes than most other soils in the country. Swamp soils are found along the coast and in the interior; they account for about 4% of all soils. This type of soil, when properly drained, provides good conditions for the cultivation of swamp rice and similar crops. This is also true for the mangrove swamp soils that occur in the lagoons, near the mouths of rivers and in the coastal low lands. These soils consist of a series of layers of decaying plant materials, salt, mud, gravel, sand and peat; they could be adapted to large-scale paddy rice production.

In general, Liberia's soils are characterized by a shallow layer of humus, a low humus content and high acidity as a result of deficiency in magnesium and calcium.

3.1.3 Culture and socio-Economic Data

Demography and Culture Settings

Since 1970 the population of Liberia has been growing at a rate of 3%. Liberia's population in 1974 was at 1.55 million; that is a density of 41 people per square mile. It rose to 2.15 million in 1984, which equals the density of 57 persons per square mile. In 2002, Liberia's population reached 2.7 million with a density of 71. In 2006 it is estimated over 3 million. That density remains lower than those of neighboring states on the West African Coast.

Most of the urban people are found in cities along the Atlantic coastline. Monrovia is the largest city with a pre-war population of about 250,000 people. Due to increasing insecurity in many parts of the country, exodus of people into Monrovia has swelled the population to more than one million.

Human mortality is caused mainly by malaria (16.5%), anemia (12.6%), respiratory infection (12.5%), diarrhea (5.6%), hypertension (4.6%), and malnutrition (4.4%).

The population of Liberia is young. In 1984, it was estimated that 44% of the population was less than 15 years of age. The female population is higher than the male counterpart, but there are more literate males than females.

Culture

The formation of the Liberian society in the 19th century was characterized by a conspicuous cultural gap between the settlers, who were descendants of slaves, and indigenous people. By 1945, that culture divide was reduced by the emergence of a more modern economy, thereby breaking down the barriers that had isolated the two groups for long. After this time, new social categories based on occupation, education and income rather than ethnicity emerged. However, a relatively small group of settlers continued to constitute the elite, but its dominance ended abruptly by the military coup in 1980, which brought the indigenes into power.

There are 16 major ethnic groups. The largest ones are Kpelle in the center, the Kru and Bassa on the coast, the Krahn and Grebo in the southern and the Lorma in the north. The smaller ethnic groups include Belle, Sapo, Mende, Gbandi, Vai, Mandingo, Gio, Mano, Kissi and Gola. These tribes constitute 97% of the population and the re-settlers are about 3% of the population. English is Liberia's official language, but each ethnic group has its own language.

Animist traditional religion is still practiced by some of the people: Liberia is said to be founded on Christian principles, however, many other religions have emerged over the years. Islam is now becoming very widespread, but visible religious activities are mostly among Christians as Liberians are good churchgoers. There is a special handshake, where the right hand's middle fingers are held together between the thumb and third finger. This is called the 'snapshake', a sign of freedom, popularized by the re-settlers and is a custom dating back to the independence of the country.

The crafts are carving, particularly of ebony and mahogany, manufacturing of ritual masks, batik and embroidered clothing as well as metal works and basket weavings.

Rice is Liberia's staple food. Cassava, eddoes, sweet potatoes, hot red pepper and bananas also constitute the Liberian diet. There is no national food, but each traditional setting has its local food served to welcome guests. Palm butter is the traditional food of southeastern Liberia, people in the Northwest traditionally eat cassava leaf and Togborgee is popular among northerners.

Economy

Liberia's economy is largely dependent on rubber, timber, gold, diamonds and agricultural crops.

The country is now a low-income nation, with a per capita GNP of US$188 in 1999 and an annual inflation rate of 14% in 1999, agriculture and forestry accounted for 61.3% and 13.4% of the GDP respectively; while mining, services and manufacturing contributed 2.1%, 2.4% and 4.7% to the GDP, respectively (MPEA & IMF, 2003). The World Fact Book estimates the GDP at purchasing power parity for 2005 at US$2.755 billion.

The primary sector is dominated by agriculture, which comprises rubber, cocoa and coffee, fishery, forestry and other food crops; and mining. The secondary sector is composed mainly of manufacturing, while the tertiary sector comprises electricity, water, transportation, communication, maritime ship licensing registry and services. Biological resources, especially agriculture and forestry, contributed 74.7% of the GDP in 1999.

Rubber is one of Liberia's main export cash crops. It contributes more than US$57 million annually to export earnings. Production grew in 1999 to 62,705 metric tons (valued at US$33.3 million) from 48,916 metric tons (valued at US$ 28.9 million in 1998) - an increase of 28.2% over 1998. During the year 2000, production of rubber rose to 102,412 metric tons (valued at US$3.2 million), a 63.3% increase over 1999 production. Major rubber concessions include the Firestone Plantations Company, Liberia Agricultural Company, Cocopa Rubber Company, Weala Rubber Corporation and the Cavalla Rubber Corporation. Besides these concessions, the communal, family and individual production activities are widespread around the country.

Rubber is tapped from Havea brasiliensis, an exotic plant from Brazil, but over the years there has been some advancement in biotechnology to produce various clones. Many clones were imported into the country, and recently, Firestone and LAC developed their clones in Liberia.

Cocoa and coffee are traditional export commodities of Liberia. They contribute significantly to household and domestic income. According to the Central Bank of Liberia (2000) production has been on the increase since 1998. A total of 2,040 metric tons and 358 metric tons of cocoa and coffee valued at US$1.6 million and US$0.24 million respectively were exported in 1998. In 1999, a total of 2,591 metric tons of cocoa was produced, an increase of 27% over 1998 production. Coffee production in 1999 was 808 metric tons, representing 125.7% increase over 1998 production figure.

Fishery is an important economic activity for a significant proportion of the Liberian population, mainly for those who live along the coast. Besides the five fishing enterprises, only four companies are reporting fish production statistics. Fishing is also done by artisan fishermen, whose harvest is predominantly subsistence-oriented. The fishing resources off the Liberian coast in 1984 were believed to be considerable and included such well-known food fish as croaker, grunter, sea bream, mackerel, snapper, sole, grouper, tuna, and various sardines. Shrimps, rock lobsters, crabs, and oysters were also caught. Inland subsistence fishing is carried out on the lagoons, swamp, streams, and rivers throughout the country.

Table : Annual Marine and Freshwater Fish Production (Metric Tons)

Year	Marine Catch	Freshwater Catch	Total
1986	11,986	4,073	16,059
1987	14,613	4,122	18,734
1988	11,944	4,111	16,055
1989	10,582	4,223	14,805
1990	2,314	4,121	6,463
1991	5,586	4,033	9,619
1992	4,784	4,104	8,888
1993	3,734	4,044	7,778
1994	3,685	4,036	7,721
1995	5,226	4,006	9,232
1996	3,108	4,128	9,232
1997	4,554	4,026	8,580
1998	NA	NA	10,830
1999	NA	NA	15,742

Source: National Bureau of Fisheries, Ministry of Agriculture

Livestock production

Livestock production in Liberia has always been the least prioritized as compared to crops. The industry plays a minimal role in agricultural development. This is indicated by the high annual importation of livestock as well as livestock products. Cattle, goat, sheep, pig, rabbit, guinea pig, chicken, duck and guinea fowl are used in Liberian agriculture.

Nimba County is recorded to have the highest livestock production in both pre-war (55,096) and post-war (24,362) followed by Montserrado, Grand Bassa and Bong Counties, respectively.

Table : Livestock Population for Eight Counties

Livestock	Pre-war	Post-war
Cattle	3,192	139
Goat	15,641	4,187
Sheep	10,190	1,340
Pig	12,838	7,212
Rabbit	187	96
Guinea Pig	48	24
Chicken	34,903	16,987
Duck	7,063	4,825
Guinea Fowl	542	290
Total	**84,604**	**35,100**

Source: FAO 2002

Forestry

Forestry resources remain one of the most important economic assets of Liberia. In 2002 timber was the main export item, contributing more than US$85 million to Liberia's foreign exchange earnings. Besides sawn timber, round logs and charcoal are valued forest products. In 1998 round log exports totaled US$12.3 million and rose to US$23.4 million in 1999 and to US$59.5 million in 2000. The absence of publicly distributed electrical power in the country for more than a decade has made wood the major source of energy, as only few affluent people can afford electric and gas cookers and power generators. In 1998, a total of 14, 890 kilograms of charcoal were produced; this rose to 255,624 kilograms in 1999 and totaled 258,934 kilograms in 2000.

Mining

Mining, especially of iron ore, was the mainstream of the Liberian economy during and up to 1989. But with the closure of iron ore mines due to the civil war (1989-2003), gold and diamond mining became the major activities in the sector. Significant amounts are mined by artisan miners using crude production techniques.

In 1998, a total of 7,741 carats of diamond and 2,318 ounces of gold were produced; gold production dropped to 550 ounces in 1999 and fell further to 482 ounces in 2000. Diamond production on the other hand gained momentum in 1999 with 8,437 carats and further increased to 22,112 carats in 2000.

The secondary sector

The secondary sector comprises mainly manufacturing, which is dominated by such key activities as food processing, wood-based products, chemicals, cement, building materials and brewing of beverages. During 1998, a total of 5.2 million liters of non-alcoholic and 3.5 million liters of alcoholic beverages totaling 8.7 million liters were

produced. The output of beverages declined significantly in 1999 to 5.6 million liters and fell further to 4.9 million liters in 2000. Paint output totaled 85,000 gallons in 1998 and 42,767 gallons in 1999; but fell to 37,366 gallons in 2000.

The Tertiary Sector

The Tertiary Sector, which comprises electricity and water utilities, transportation, communication, and services, contributes less to the GDP than the other two sectors.

Maritime

Liberia is the second largest maritime registry in the world with more than 1,800 vessels registered under its flag, including 35% of the world's tanker fleet, and earning more than US$13 million in 2002.

The informal sector

The informal sector also contributes significantly to the national economy, though national income accounts do not record its performance.

In 2003, Liberia imported more than it exported, and the national debt amounts to US$3 billion. The unemployment rate is 70%, and 80% of the population live below the poverty line.

Table : Sectoral Contribution to GDP in US$ (1988-2002)

Sector	1988	1998	1999	2000	2001	2002
Agriculture	212.3	229.4	227.0	289.5	301.1	311.3
Rubber	86.6	37.6	61.7	64.8	68	69.4
Coffee	2.2	0.5	0.7	0.8	0.9	1.1
Cocoa	11.4	1.6	2	2.5	3.1	3.9
Rice	9.9	64.2	72.5	76.1	78.4	80.7
Cassava	33.4	44	48.4	50.8	53.4	56
Others	68.8	81.5	91.7	94.5	97.3	100.2
Forestry	82.3	53.4	60.7	63.7	66.9	68.3
Logs and Timber	62.2	13	19.3	23.2	27.8	32
Charcoal and Wood	20.1	40.4	41.4	40.5	39.1	36.3
Mining	121.5	8.6	9.8	9.9	10.1	10.1
Iron Ore	108.4	0	0	0	0	0
Others	13.1	8.6	9.8	9.9	10.1	10.1
Manufacturing	78	17.3	21.4	24.1	26.5	28.3

Tertiary Sector	475.5	85.5	82.6	97.1	90.0	119.9
Electricity and Water	12.4	1.5	2.3	2.3	2.3	2.5
Construction	45.4	5.6	6.9	8.5	10.3	11.8
Trade, Hotels, etc.	89.6	11	17	18	19	20.1
Transportation & Communication	136.9	16.8	21.6	27.8	13.6	37.4
Financial Institute	88.8	10.8	13.3	15.3	17.6	19.3
Government-Services	50.4	6.2	11.2	12.3	13.6	14.4
Others	51.9	6.4	10.3	12.9	13.6	14.4
Imputed Bank Charges	27.1	2.3	3.2	3.7	5	7.8
GDP	**942.5**	**391.9**	**448.3**	**480.6**	**489.6**	**530.1**

Source: Ministry of Planning & Economic Affairs, 2003

3.1.4 Environmental Overview

Liberia is endowed with valuable natural resources that could contribute to the socio-economic development of the nation However, over the past ten years, uncontrolled exploitation of Liberia's natural resources and other unsustainable human activities have created environmental degradation problems that need to be addressed urgently. Further exacerbating the situation, the civil war destroyed most of the country's infrastructure and affected virtually the entire country.

The most significant causes of environmental degradation in Liberia are shifting cultivation, logging, fuel wood harvesting and charcoal production, sprawling settlements, illicit fishing and mining activities. According to 1985 figures, Liberia's forest cover was estimated at 49% of the dry land area with an annual deforestation rate of 1%. Shifting cultivation is the cause of approximately 95% of deforestation. The remaining 5% are attributed to the other forest-related activities. Apart from the forest, chemicals and hazardous waste management are problems that have not been fully addressed.

Environmental problems

Liberia's traditional economic activities have caused much of the environmental degradation in the country: unregulated logging activities in National Forest Reserves, where clear cutting practices and construction of access roads take place, expose the forest to further threats by human settlement, farming, and mining activities. Inappropriate mining has led to destruction of forest vegetation and important habitats; it also causes water pollution by heavy metals and the creation of large pits, which pose danger to people and animals. The problem in summary:

1. Destruction of the forest and vegetation by over-harvesting, shifting cultivation, charcoal production and excavation without any restoration

2. Destruction of important habitats such as swamps and beaches by solid waste dumping and urban encroachment

3. Pollution of waters by industrial activities, mining, solid waste and chemicals, as well as sewage

4. Infrastructure activities like road construction, which create larges pits, which are a danger to livestock and humans, as well as becoming breeding grounds for mosquitoes when the fill up with water

5. Lack of environmental awareness

6. Lack of a chemicals management mechanism

Further, there are some 15 government institutions regulating different aspects of environment-related activities in Liberia. The absences of an overarching environmental policy and legal framework results in overlapping and conflicting laws that sometimes lead to enforcement gaps, which are detrimental to the environment. This has recently been addressed with the establishment of the EPA.

Civil war related environmental problems

In addition to the environmental problems resulting from the normal human activities, the environment-related problems resulting from the civil ware persist unabated some three years after the hostilities ceased and a government was elected. The following is a summary of some of the chemical related problems:

1. The lack of central electricity has caused a proliferation of generators that, in addition to electricity, also generate air and noise pollution. Further, the use of charcoal as an alternative source of energy for cooking and the use of the ubiquitous plastic bags to start the fire and use as containers pollutes the environment and endangers the health of humans. These are sources of dioxin and furan emissions

2 The lack of a POPs policy and legislation

3. The uncontrolled discharges of chemical and hazardous waste

4. The a rural-to urban rush caused by the civil war has resulted in a large urban population that is unsupported by basic service; solid waste and chemicals management are now major problems

Development Objectives

It was against this backdrop that the President announced in October 1998 the formation of the National Environmental Commission of Liberia (NECOLIB).

The Government of Liberia and UNDP developed an Environmental Project with the overall objective of strengthening the National Environment Commission.

This Commission evolved into a full-fledged semi-autonomous Environmental Protection Agency (EPA). The EPA is responsible for the coordination of sustainable environmental management through the implementation of Agenda 21 National Action Plan, with specific objectives as follows:

1. To strengthen the National Environmental Commission through capacity building;

2. To promote environmental outreach programs nationally;

3. To facilitate international and regional cooperation and meetings under conventions for environmental protection; and

4. To produce an environmental policy and prepare an environmental legislation (an environmental legislation has been produced).

4. INSTITUTIONAL, POLICY AND REGULATORY FRAMEWORKS

Administrative Agencies

The following ministries and agency deal with various aspects of the importation, distribution, sale, general use, storage and disposal of chemicals in general.

The **Ministry of Agriculture (MOA),** through its Division of Agrochemicals, regulates and approves the use of farm chemicals and pesticides.

The **Ministry of Commerce and Industry (MOCI),** through its Division of Foreign Trade, regulates and approves the domestic and foreign trade in all commodities, including chemicals and pesticides. Its EPD and IPD documents list importers of chemicals and pesticides in Group 5: CHEMICALS (using the Standard International Trade Classification of the United Nations (SITC)).

The **Ministry of Finance (MOF),** through its Bureau of Customs and Excise, lists and collects taxes on the importation of commodities, including chemicals and pesticides.

The **Ministry of Health and Social Welfare (MHSW),** through its Division of Environmental and Occupational Health, regulates and approves the use of industrial chemicals and pesticides.

The **Environmental Protection Agency (EPA)**, one of the youngest administrative agencies, is charged with the responsibility of managing the environment in a sustainable manner and providing appropriate information and advice on the state of the environment in consultation with the relevant line administrative agencies.

Environmental Policy and General Legislative Framework

The EPA Act

The Act creating the EPA now requires environmental impact assessment (EIA) of all activities, decisions, programs, projects and policies, which may have significant impacts – beneficially and adversely – on human health and the environment.

The National Environmental Policy of Liberia

The National Environmental Policy of Liberia provides a broad framework for the proper and responsible management of natural resources and the protection of human health and the environment.

The Environmental Protection and Management Law

Part IV of the Environmental Protection and Management Law provides for the establishment of standards by the EPA, in consultation with relevant line administrative agencies, regarding water and air quality, toxic chemicals and

pesticides (including POPs), hazardous wastes and materials, waste management, soil quality as well as noise pollution, noxious odors, ionization and radiation.

Regulations

The administrative agencies mentioned above promulgate from time to time appropriate regulations pursuant to the statutes for which they are responsible.

A POPs Regulatory Regime

There is currently no domestic legislation specifically regulating the use of POPs pesticides in Liberia, but a broad national legal and institutional framework exists for the issuance of such regulations and their enforcement. An opportunity for a domestic regulatory regime presently exists, because Liberia is a signatory not only to the POPs Convention but also to a number of other similar international legal instruments, including the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, and the Basel Convention on Trans-boundary Movement of Hazardous Substances.

Institutional Roles and Responsibilities

A number of state structures, research institutions and non-governmental organizations are involved in the management of chemicals and related activities. They include the following:

Environmental Protection Agency (EPA)

Principal authority for the management of the environment, and mandated to coordinate, monitor, supervise and consult with relevant stakeholders on all activities in the protection of the environment and sustainable use of natural resources; promotes environmental awareness and the implementation of the national environmental policy and the environmental protection and management law; oversees the implementation of international environment related conventions.

Forestry Development Authority (FDA)

The FDA is responsible to sustainably manage the forest and its related resources. The agency provides long and medium-range planning in the forest sector as well as preparing forestry policy, law and administration; supervises forest legislations and concession agreements; calculates and determines forestry fees; evaluates investment proposals; executes reforestation and forest research and training, monitors activities of timber companies, executes protected area programs and administers wildlife and national parks.

Ministry of Agriculture (MOA)

Plans, executes, administers, manages and supervises agriculture programs and provides extension services; trains local farmers in improved cultural practices, and supplies to farms inputs to enhance food security.

Ministry of Land, Mines and Energy (MLME)

This Ministry has the statutory responsibility for the development of mineral, water and energy resources of the country and the administration of its lands; is in charge of land surveys in all parts of the country; coordinates the activities of miners of gold and diamonds, including granting of operation licenses; regulates beach sand mining and works along with the Ministry of Agriculture and the University of Liberia to conduct training research on land rehabilitation.

Ministry of Planning and Economic Affairs (MPEA)

The Ministry serves as the direct link between implementing Ministries/Agencies, NGOs, PVOs, and the international community. In addition, MPEA is responsible to:

1. Give technical guidance to all GOL agencies in the preparation of development programs and projects;

2. Review proposals for new development programs and projects on changes in existing programs and projects under consideration in view of the resources available and make recommendations to the national planning council.

3. Review progress made on programs and projects, which have been adopted, initiating special investigation into the execution of those programs and projects, and report findings and recommendations to the national council.

Bureau of Maritime Affairs

This agency is in charge of Liberia's maritime program, with much of its work directed at the ship registry.

Ministry of Health and Social Welfare (MHSW)

The Ministry coordinates and administers the general health services of the Country; ensures the availability of drugs; collects health statistics and monitors events and conditions affecting the general public. The Ministry is in charge of preventive and curative services and vital statistics for the registration of deaths and births.

Monrovia City Corporation

Monrovia City Corporation was first created as Commonwealth District in 1833 by the Commonwealth of Liberia. A legislative Act of 1973 abolished the Commonwealth District and created the Monrovia City Corporation, giving it all municipal rights, power and authorities, including enforcement of city ordinances, management of municipal wastes, recreation, public education and awareness and provision of services in environmental health and sanitation.

Liberia Water and Sewer Corporation (LWSC)

Responsible to plan, execute, administer, manage and supervise the generation and distribution of water to the public. It is also responsible for the supply of safe drinking water, provides service concerning the sanitary disposal of waste and maintains the water sewage facilities. The corporation produces, transmits and

distributes pipe-borne water. The corporation rehabilitates water and sewer facilities throughout Liberia and improves and expands services to meet the water needs of all residents.

Liberia Electricity Corporation (LEC)

LEC was created by an Act of the National Legislative in 1973 with the mandate to generate, transmit, distribute and sell electricity at an economically reasonable tariff throughout the length and breadth of the country; plans, executes, administers, manages, and supervises the generation and distribution of electricity.

Liberia Petroleum Refining Corporation (LPRC)

The LPRC plans, executes, administers, manages and processes crude oil into finished petroleum products for the Liberian market and also ensures that petroleum products are always available.

Liberia Mining Company (LIMINCO)

The Liberia Mining Company took over from LAMCO operating Company and is placed in charge of the facilities of that company. LIMINCO is responsible for any negotiation regarding exploration of Mount Nimba and future investment of that massif.

Center for Environmental Education and protection (CEEP)

Center for Environmental Education and Protection of Liberia (CEEP) has the mission to contribute to poverty reduction through environmental education and public awareness. The organization usually lobbies and advocates for sustainable development. CEEP has been engaged in teaching principals and concepts of environment in school and the communities through workshops and seminars.

Environmental Relief and Development Research Organization (ERADRO)

Environmental Relief and Development Research Organization (ERADRO) is involved with the promotion of extension services in the field of environmental research, social mobilization, animation of health/hygiene education, solid/domestic waste programs in schools and communities.

Pollution Control Association of Liberia (POCAL)

This association advocates proper waste management, organizes nature clubs in schools and supports environmental drama clubs in communities; it established a botanical garden in Johnsonville, Montserrado County, where integrated pest management is being taught. It also conducts a public awareness program on POPs.

Liberia Indigenous Forum for the Environment (LIFE)

The Liberia Indigenous Forum for the Environment strives to work with local communities to bring about awareness and empowerment on matters of environmental and conservation concerns. One of its major thrusts is to ensure that traditional knowledge is respected and maintained in Liberia. It propagates conservation of

biodiversity, especially of medical plants. LIFE has been concerned about the state of timber operations, especially the fate of some timber species thought to be threatened or vulnerable.

Association of Environmental Lawyers (GREEN ADVOCATES), INC. (AEL),

Established in December 2000 by a group of lawyers, it strives to create and maintain a multi-disciplinary environment team. Green Advocates Team on the Environment (GATE), comprises not only lawyers but also professionals with science, engineering and other career backgrounds, critical to the accomplishment of the group's mission of protecting the environment through law; it advocates appropriate environmental protection legislation and pursues court action to compel compliance with and enforcement of current environmental laws.

Enviro-link Liberia,Ltd

This organization links people and communities to the environment through advocacy, awareness, education, training and research; involved in environmental impact assessments in collaboration with the EPA and other environmental institutions.

University of Liberia (UL)

The University of Liberia attracts many hard-core professionals in the colleges of science and technology, agriculture and forestry, and business and public administration. The College of Science and Technology offers bachelor's degrees in biology, zoology, engineering, chemistry, geology, physics and mathematics. The College of Environmental Science is in the making.

Cuttington University College (CUC)

The Cuttington University College in Central Liberia offers bachelor's degrees in general science, biology, chemistry, physics and mathematics. Other relevant courses offered in the area of biodiversity are agriculture and rural development.

Liberia Agriculture Company (LAC)

LAC operates a rubber plantation in Grand Bassa County; developed pasturelands and once dealt in raising cattle; develops rubber clones for its own use.

Firestone Plantations Company

Established in 1926, operates the world's single largest rubber plantation at Harbel in Margibi County; established a nursery for rubber clones and was once involved in botanical research; owns and operates the largest private hydroelectric plant in the country.

Additional information is given in 5.9 of this document: (Relevant Activities of non-governmental organizations)

Relevant International Agreements and Commitments

Together with other states, the Republic of Liberia adopted Agenda 21 and the Rio Declaration at the United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992), and the Johannesburg Declaration on Sustainable Development and Recommendation for Submission to the UN General Assembly at the World Summit on Sustainable Development (Johannesburg, 2002). The Republic of Liberia has signed and ratified a number of Conventions and Agreements relating to the environment. The EPA is the officially assigned National Focal Point responsible for international agreements on various environmental and management issues of chemicals substances and wastes. A list of related international chemicals agreements to which Liberia is a Party and ratification dates are provided in Annex I.

Key Approaches and Procedures for POPs Chemicals and Pesticides Management including Enforcement and Monitoring Requirements

The key approaches for POPs management that currently exist include:

- Banning the production and importation of POPs pesticides according to the public health law
- Banning the importation of hazardous and toxic wastes
- Controlling the import and export of toxic and hazardous wastes

The use of POPs pesticides has been restricted since 1999 and the ban on importation has been in effect since 2000. Officially, there has been no record of importation of these pesticides.

Liberia is a signatory to the Basel Convention and there is no record of PCB exportation.

The government once initiated a program to manage PCBs. LEC, FPCO, EM and UL were selected for the initial identification of PCBs in Liberia. FPCO and EM did not respond and the assessment was only confined to the LEC facilities. There is no other active monitoring program for measuring PCBs in electrical equipments or in the environment and no other programs for the measurement of ambient levels of PCBs or other POPs chemicals in Liberia.

There are no specific measures for reducing the formation of dioxins and furans during the burning of garbage. An enforcement mechanism banning open burning was suggested at a solid waste management meeting.

5. ASSESSMENT OF POPS ISSUES IN THE COUNTRY

Assessment with respect to Annex A, part I chemicals (POPs pesticides)

Historical, current, and projected future production; use, import and export; existing policy and regulatory framework; summary of available monitoring data (environment, food, humans) and health impact.

5.1.1 Summary

44 sites were identified in 12 zones for the initial phase of this research project. Only areas, which the team reasonably believed to be relatively secure and accessible, were included. 32 of the 44 sites were covered in this first phase. The rest and additional sites may be covered when adequate funding is available and adequate levels of security and accessibility are reached.

Some importers of agrochemicals such as ANARCO and Green Farm are not listed by any of the ministries mentioned above.

Several types of agrochemicals were found on sale in some of the major local general markets such as Duala Market and Paynesville Red Light Market. Some agrochemicals are sold in clearly labeled containers, indicating that the contents are non-POPS chemicals. Also, some agrochemicals are sold in unlabeled containers, which their sellers claim to be whatever the potential buyers demand, such as dieldrin.

The findings of the inventory research reveal that petty chemical vendors do not know the types and nature of chemicals they sell. Some agrochemicals, which are dangerous but not among the "dirty dozen", such as endosulfan, were found on sale in the Duala and Paynesville Red Light Markets. Equally significant is the fact that investigation concerning the sources of the chemicals on sale in these local markets reveals that some chemicals are obtained through cross-border trade between Liberia and Guinea.

The research, upon the basis of its findings, cannot conclude whether or not POPs pesticides are imported or used in Liberia. Nor can much more be said about POPs stockpiles and wastes in the country.

The eight organo-chlorinated pesticides selected for this research project are aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex and toxaphene. They are collectively referred to as Annex A, Part I Chemicals because the Stockholm Convention on Persistent Organic Pollutants (POPs) prioritizes them for elimination, subject to specific exemption in Part I of Annex A: Elimination.

The Stockholm POPs Convention not only aims to eliminate the "dirty dozen", but also it requires all nations with a regulatory regime for pesticides and industrial chemicals to "regulate with the aim of preventing the production and use of new chemicals" that exhibit POPs properties or characteristics. In a nutshell, it bans the deliberate introduction of new POPs into the environment.

The initial phase of the POPs inventory research began on November 15, 2004 and ended on February 15, 2005. The findings of the research project, which are summarized in this section, should facilitate the NIP preparation process.

5.1.2 Inventory Methodology

The inventory study was conducted in keeping with the Team's work plan, terms of reference (TOR), and the guidelines for the initial identification of POPs pesticides, DDT and PCBs.

In a bid to determine the target locations or establishments, the team visited the Ministry of Agriculture (MOA), Ministry of Commerce and Industry (MOCI), Ministry of Finance (MOF), Ministry of Health and Social Welfare (MHSW) and Ministry of Planning and Economic Affairs (MPEA) as well as establishments known to be dealing in agrochemicals and pesticides such as ANARCO Enterprises, Green Farm, Light Enterprises and A.D. Meah's Maintenance Service. The latter two firms do general fumigation.

29 sites or establishments were visited and investigated in Monrovia and its environs for the eight organo-chlorinated pesticides and DDT. Some institutions including LIPFOCO (a foam mattress maker that also imports various chemicals for trading purposes) and A-Z Corporation (listed by MOF as a pesticide importer) were very hostile and highly uncooperative.

The relevant administrative agencies, which were visited such as MOA, MOCI, MOF, MHSW and MPEA, have no information on the use or importation of agrochemicals and pesticides in Liberia. MOA provided a listing of banned and permitted chemicals; the Division of Foreign Trade, MOCI, EPD/IPD documents; MOF has a list of pesticide importers; the Division of Environmental and Occupational Health of MHSW has a list of chemical and pesticides that require Liberia's interim decisions on import under the PIC procedure for certain hazardous chemicals and pesticides in international trade of the Rotterdam Convention; and MPEA, has a consolidated listing of NGOs involved in various sectors, particularly in the agricultural sector. LEC provided the most comprehensive literature and highest level of cooperation.

A contact person was identified at each of the 27 establishments, which agreed to participate in the inventory. The contact person then provided the team with whatever information or data were available. The team also conducted physical inspection and interviews during the various field visits.

Data collected were analyzed, compiled in tabular form and submitted to the project office for perusal, review and comments.

5.1.3 Institutional and Regulatory Frameworks

See also 4.0, 4.1, and 4.2

International Conventions

Liberia has acceded to or ratified some major international conventions on chemicals and pesticides. These Conventions provide a broad basis for the enactment of

relevant domestic legislation to regulate the importation and use of industrial chemicals and pesticides (see ANNEX 1).

POPs Regulatory Regime

See 4.1

5.1.4 Past, Present and Projected Future Production and Use of POPs Pesticides in Liberia

More than 70% of the country's population depends on agriculture with shifting cultivation as the principal farming system. Crop yields are reduced in this country and in other regions of the world by some 10,000 different insect species, 8,000 fungal species, and 2,000 weed species.

By far the nation's largest food producers (of course farm output has dropped due to displacement and destruction), traditional farmers rarely use such modern farm inputs as pesticides, mainly because of poverty and customary practices. Instead, they often use fire to fight these noxious insects and fungal diseases. Modern vegetable gardeners, using small plots of land, usually employ pesticides. It was difficult to obtain information from larger cash crop farms, since many of them are controlled by the fighting factions.

During the visit of UNIDO's international expert, Dr. Richard Temsch, the Deputy Minister of Agriculture for Technical Services, Dr. Leon Q. Ledlum, suggested to send out a questionnaire on pesticide use to the farmers, which was then done by the National Project Coordinator.

Import and export of POPs pesticides

The Ministry of Agriculture is not aware of any legal imports or exports of POPs pesticides. There is reason to believe that some pesticide smuggling occurs, in particular across the porous border with Guinea.

Identified stockpiles of POPs pesticides and empty containers

Neither stockpiles nor empty containers were found at the establishments that the team visited.

Production

Liberia has never produced any pesticides.

Use

Individual buyers use pesticides, as they deem appropriate.

Stockpiles and wastes

Liberia has no waste management plan currently. Wastes in general are dumped by individuals into the environment with impunity.

Assessment with respect to Annex A, part II chemicals (PCBs)

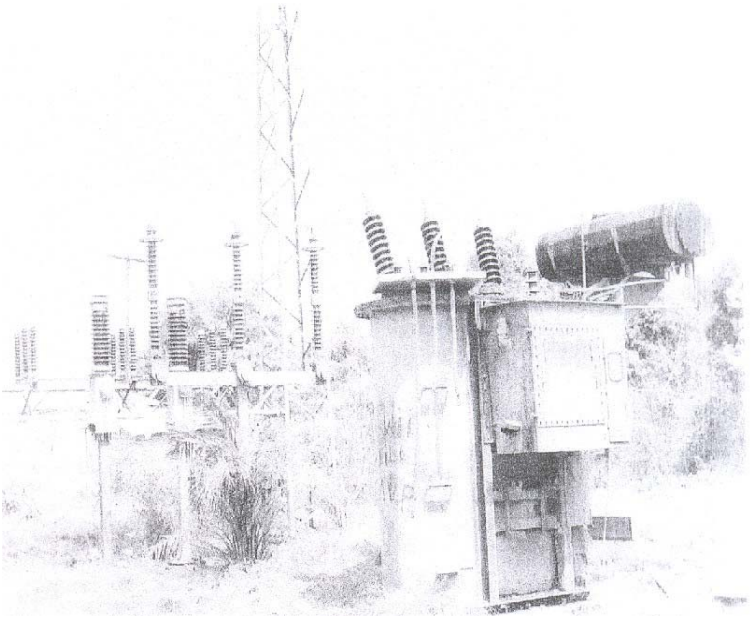
5.1.5 Summary

44 sites were identified in twelve 12 zones for the initial phase of this research project. Only areas, which the team believes reasonably to be relatively secure and accessible, were included. 32 of the 44 sites were covered in this first phase. The rest and additional sites may be covered when adequate funding is available.

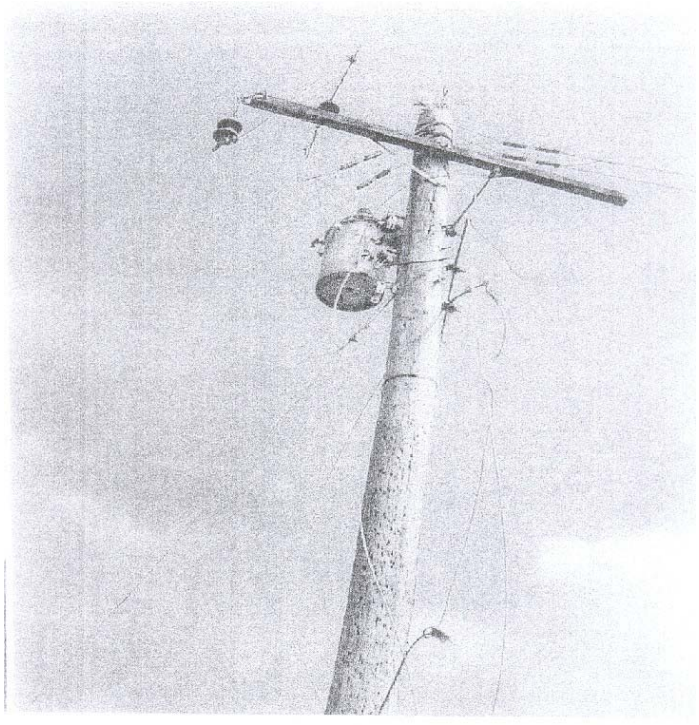
PCBs are biphenyl molecules (two benzene rings bonded together by a single carbon-carbon bond) with up to 10 hydrogen atoms replaced by chlorine atoms.

Before the onset of the Liberian civil war in December 1989, power companies and concessions, including LEC, BMC, FPCO and LAMCO/LIMINCO, had a total installed capacity of 412,700 kW (or 515, 900 kVA). To transmit and distribute the power generated, these establishments purchased and installed more than 40 unit (large step-up) transformers. Between 3,000 and 4,000 distribution transformers, consisting of pole-mounted, pad-mounted and pier stations, were installed. The R.E. outstations had 15 unit and 762 distribution transformers in service.

No record is available to confirm that power companies or concessions ever used capacitors for power factor (p.f.) correction. But LEC engineers once recommended McGraw – Edison Power Systems EX – 7 high-stacking power factor capacitors. Introduced in 1987, these capacitors were impregnated with Edisol XT fluid, a non-PCB aromatic hydrocarbon, comprising phenyl xylyl ethane (PXE) and phenyl tolyl methane (PTM). MEPS is said to have developed the industry's first environmentally safe non-PCB dielectric fluid in 1975.



Old LEC substation



A damaged pole mounted transformer in Sinkor, Monrovia

The LEC authorities were highly accommodating and quite aware of the PCB issue.

5.1.6 Background

The Stockholm Convention not only aims to eliminate the "dirty dozen", but also it requires all nations with a regulatory regime for pesticides and industrial chemicals to "regulate with the aim of preventing the production and use of new chemicals" that exhibit POPs properties or characteristics. In a nutshell, it bans the deliberate introduction of new POPs into the environment.

The initial phase of the POPs inventory research began on November 15, 2004 and ended on February 15, 2005.

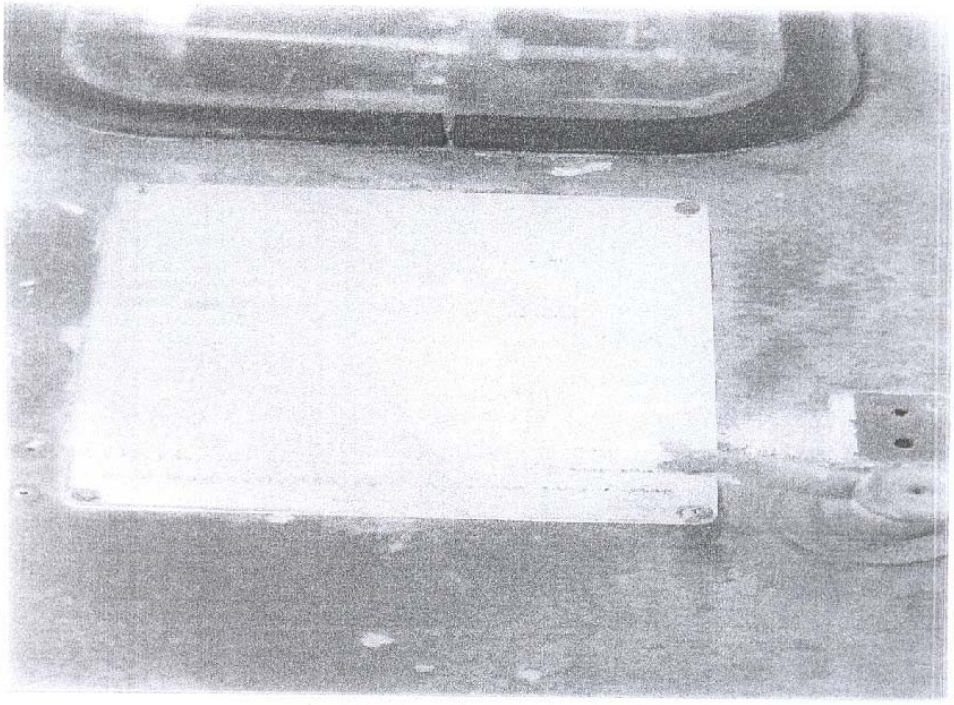
The findings of the research, which are summarized in this section, have been used in the NIP preparation process.

5.1.7 Survey Design and Methodology

The survey design was dictated by Part II of Annex A of the Stockholm Convention, the basic assumptions in the US EPA manual, Guidelines for the Management of Polychlorinated Biphenyls (PCBs) in the United States, UNEP Guidelines on PCB identification, desk review of other relevant literature, the teams' terms of reference (TOR), and the decision to prioritize target locations or establishments where the largest quantities of PCB were expected to be found.

Because the wide range of PCB applications and uses complicates the inventory process, only closed and semi-closed applications were considered in this initial

phase. Consequently, only power facilities or electrical systems were targeted, particularly those of LEC, UL, EM and FPCO.



Unreadable name plate on an old transformer

During the inspection of those facilities, PCB inventory forms (see Annex) were used. Chemical analysis was avoided as advised.

During the survey, the team carefully reviewed available supplier documentation, nameplates and reference materials. Transformers without nameplates or supplier information were assumed to contain a PCB concentration of at least 500 ppm. Transformers with nameplates or supplier information that did not indicate the type of dielectric fluid were treated likewise. All transformers containing mineral oil with unknown PCB contamination were assumed to have 50 to 499 ppm of PCB concentration. All transformers out of service and other potential PCB containing equipment falling within the scope of the preceding methodology or basic assumptions were recommended for removal, storage and subsequent disposal.

5.1.8 Present Regulations

There is currently no domestic legislation specifically regulating the use of PCBs in Liberia. However, a broad national legal and institutional framework exists for the issuance of such regulations and their enforcement.

The National Environmental Policy of Liberia provides a broad framework for the proper and responsible management of natural resources and the protection of human health and the environment.

The Act creating the EPA now requires environmental impact assessment (EIA) of all activities, decisions, programs, projects and policies, which may have significant impacts – beneficially and adversely – on human health and the environment.

Part IV of the Environmental Protection and Management Law, provides for the establishment of standards by the EPA, in consultation with relevant line administrative agencies, regarding water and air quality, toxic chemicals and pesticides (including POPs), hazardous wastes and materials, waste management, soil quality, as well as noise pollution, noxious odors, ionization and radiation.

Closed and semi-closed applications

PCBs, comprising 209 different isomers or congeners, were produced as industrial chemicals particularly for insulation in electrical equipment and are also produced as unintentional by-products of incineration as well as certain chemical processes involving chlorine, such as polyvinyl chloride (PVC) production.

Past and present use of PCBs in equipment

Until the mid 1960s (from the late 1920s when PCBs were commercially produced), vast amounts of the chemicals entered the environment. Since 1976, the OECD countries have restricted the manufacture, sale, import, export and general use of PCB containing equipment. Most developed nations started phasing out PCB containing equipment in the1980s. Most developing and least developed countries in the South are still using such equipment today.

The uses and applications of PCBs are numerous, which complicates the inventory process. Areas are therefore prioritized where the largest amounts are expected. The Research Team decided to focus on power companies and electrical installations, especially LEC, the largest user of potential PCB containing electrical equipment. Applications for PCBs can be classified as closed, partially (semi-) closed and open. Closed applications are systems where the PCB is contained in sealed equipment such as transformers, capacitors, electric motors and magnets. Motors and magnets are relatively minor users of PCB. Since the team considered closed applications as constituting the greatest category in Liberia, only such applications were prioritized in this initial inventory research.

Result of the inventory and extrapolation to the national level

350 transformers were counted in Monrovia, 6 of which clearly indicate that they contained less than one part per million of PCB at the time of delivery. Most of these transformers are pole-mounted 50 – 100 kVA units. Since Monrovia's power grid has been down for several years, it is not known how many of these transformers are still functioning. During the fighting many units were targeted and pierced by bullets. Once the grid will be working again, it will become clear which transformers are still operational. The rest will have to be taken down from the poles and assessed for PCB contamination.

31 transformers, including 5 new ones from Germany, were counted within LEC's Bushrod Yard. 26 of these units need to be removed, since they are not in service and assumed to be PCB contaminated. According to their nameplates, the 5 German

transformers contained less than one part per million (< 1 ppm) PCBs at the time of their delivery. They are therefore safe. One large damaged transformer is still at the Virginia Substation site. About 28-35% of the estimated 3,000-4,000 transformers installed nationwide before the war are currently available. In numerical terms, 840-1,400 transformers are available for further and closer scrutiny.

35 pieces were identified in Gbarnga and its environs in Bong County. Various authoritative sources, including those at LEC, estimate the number of distribution transformers installed before the war in Monrovia and its environs (the Monrovia Grid) at 2,000 – 2,500. The RES had an estimated number of 762 distribution transformers, 200 of which were installed in Gbarnga, the biggest rural electrification outstation before the war. On the national level, 3,000 to 4,000 distribution transformers and 40 - 50 unit (large step-up) transformers are estimated to have been installed nationwide before the war.

Although most of the transformers in the country were damaged and vandalized for their oil and scrap metal (with all of the 16 major LEC-owned substations completely destroyed), the Team, having interviewed several authorities, decided for assumption purposes to double the number of transformers identified in Monrovia and Gbarnga from 350 and 35 to 700 and 70 respectively, to account for pieces hidden behind structures and located in inaccessible places.

Taking 70 as a fraction of 200 transformers in pre-war Gbarnga means assuming that about 35% of those transformers are still in Gbarnga. Similarly, taking 700 as a percentage of the estimated 2,000 – 2,500 pieces installed in pre-war Monrovia and its outlying areas, means that about 28 – 35% of those transformers would still be in those areas.

Extrapolating the 28 – 35% to the estimated 3000 – 4000 in the whole of Liberia yields about 840 – 1,400 transformers still existing in the entire country.

The Team could not find any evidence regarding the procurement and installation of capacitors for power factor correction in the country.

Open Applications

In open applications PCBs are in direct contact with the general environment. Examples of such applications include lubricants, plasticizers and inks.

Open applications were not inventoried. Initial attempts to include institutions or establishments specializing in open applications proved unsuccessful.

PCB – containing wastes

Other than damaged transformers, no PCB containing wastes were found during the inventory.

Table : The approximate number of transformers installed at various substations and outstations before the war

No.	Town	No. of Oil-Cooled Pole-Mounted Distribution Transformers	No. of Unit Transformers
1.	Gbarnga	200	None
2.	Voinjama	75	None
3.	(Kolba)	16	None
4.	Ganta	22	1 x 1.5 MVA 12, 500/480V
5.	Saniquellie	65	1 x 0.6 MVA 12,500 / 480V
6.	Zwedru	125	1 x 0.15 MVA 12,500 / 480V
7.	Bellefanai	20	None
8.	Greenville	100	2 x 1.25 MVA 12,500 / 480V
9.	Harper	100	2x2.5 MVA 12,500/489V
10.	Robertsport	19	3 x 0.075 MVA 12K500/480V
11.	River Cess	20	1 x 1.5 MVA 12,500/480V
12.	Totota	10	None
13.	Buchanan (Substation)	500	2 x 4.7 MVA 69,000/12,500V
14.	Robertsfield (substation)	200	1 x 6.7 MVA 69,000/12,500V
15.	Kle (substation)	50	1 x 1.0 MVA 69,000/12,500V
16.	Bong Mines (Substation)	100	1 x 20 MVA 69,000/ 2,500V
17.	Kakata (substation)	200	2x1.5 MVA 69,000/12,500V
18.	Todee (substation)	10	1 x 1.0 MVA 69000/ 12,500V
19.	Bushrod (substation)	150	1 x 20 MVA 69,000/12,500V
20.	Kru Town (substation)	350	2 x 20 MVA 69,000/12,500V
21.	Capitol (substation)	200	1 x 20 MVA 69,000/12,500V
22.	Gardnerrville (substation)	325	2 x 20 MVA 69,000/12,500V
23.	Paynesville	400	1x20 MVA
24.	Congo Town (Substation)	300	2x20 MVA 69,000/12,500V
25.	Virginia (Substation)	100	1x6.3 MVA 69000/12,500V
26.	New Port (Substation)	150	2x20 MVA 69,000 / 12,500V
27.	TOTAL	3,957	38
28.	* High	4,000	40
29.	* Average	3,500	35
30.	* Low	3,000	30

Assessment with respect to Annex B Chemicals (DDT)

5.1.9 Summary

In a bid to determine the target locations or establishments, the team visited the Ministries of Agriculture (MOA), Commerce and Industry (MOCI), Finance (MOF), Health and Social Welfare (MHSW) and Planning and Economic Affairs (MPEA) as well as establishments known to be dealing in agrochemicals and pesticides, such as

ANARCO Enterprises, Green Farm, Light Enterprises and A.D. Meah's Maintenance Service. The latter two firms do general fumigation.

29 sites or establishments were visited and investigated in Monrovia and its environs for the 8 other POPs pesticides and DDT. Some institutions including LIPFOCO (a foam mattress maker) and A-Z Corporation (listed by MOF as pesticide importer) were very hostile and highly uncooperative.

The relevant administrative agencies, which we visited such as MOA, MOCI, MOF, MHSW and MPEA, have no information on the use or importation of agrochemicals and pesticides in Liberia. MOA provided a listing of banned and permitted chemicals; the Division of Foreign Trade, MOCI, EPD/IPD documents; MOF, listing of pesticide importers; Division of Environmental and Occupational Health, MHSW, listing of chemical and pesticides that require Liberia's interim decisions on import under the PIC procedure for certain hazardous chemicals and pesticides in international trade of the Rotterdam Convention; and MPEA, a consolidated listing of NGOs involved in various sectors, particularly in the agricultural sector.

Several types of agrochemicals were found on sale in some of the major local general markets such as Duala Market and Paynesville Red Light Market. Some agrochemicals are sold in clearly labeled containers, indicating that the contents are non-POPs chemicals. Also, some agrochemicals are sold in unlabeled containers, which their sellers claim to be whatever the potential buyers demand, such as DDT.

Comments and observations concerning the POPs pesticides situation in Liberia are equally valid for the DDT situation. FENDONA 5WP is reportedly used as a DDT substitute in Liberia but the Research Team could not confirm this claim. Upon the basis of its findings, the research cannot conclude whether or not DDT is being legally imported or used in Liberia. According to GOL sources and oral accounts, DDT was used for disease vector control in Liberia in the 1960s and mid 1970s but no written record was available to corroborate this claim.

A contact person was identified at each of the establishments, which agreed to participate in the inventory. The contact person then provided the team with whatever information or data were available. The team also conducted physical inspection and interviews during the various field visits.

Data collected were analyzed, compiled in tabular form and submitted to the project office for perusal, review and comments.

5.1.10 Institutional and regulatory framework

See 5.1.3

5.1.11 Legal framework

See 5.1.3

Assessment of Releases from Unintentional Production of Annex C Chemicals (PCDD/PCDF, HCB and PCB)

5.1.12 Summary

The present document summarizes the first result of the standardized Toolkit for identification and quantification of dioxin and furan releases in Liberia.

Burning of garbage in Monrovia (Gurley Street)

The inventory was established by the Contamination Task Team following UNEP guidelines and using the recommendations of the Stockholm Convention for Persistent Organic Pollutants.

Burning of garbage at both day and night

The aim of this inventory was to identify and quantify the main source of the polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) and the result is considered as first estimate of the magnitude of the dioxins and furans releases in Liberia.

This work is intended to evaluate the impact of the emissions on environment and human health, using UNEP's Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases. The protocol used includes the activities capable to generate dioxins and furans in different categories, which are divided into sub-categories.

For each sub-category the Toolkit gives emission factors, which depend on the used technology in the process.

Dioxins and furans are not deliberately but accidentally produced during synthesis or combustion of other chemicals at levels threatening to human and wildlife populations all over the world. In this inventory direct emissions to air, water, soil, residues and products were considered. The dioxin and furan emissions are mostly from the following three types of sources in Liberia, namely:

- Uncontrolled burning of domestic/municipal waste
- Domestic heating/cooking facilities (particularly wood combustion)
- Uncontrolled fires

Before starting inventorying, the first task was to identify the main activities of the main categories that are known as primary generators of dioxin and furan emissions in Liberia.

The sub-categories were also revised in order to identify the specific activities and the data collection about the processes; thereafter they were classified according to the groups of similar characteristics.

Data from the economic year 2004 was used for all identified activities and the emissions factors from the Toolkit were applied.

The annual emission is expressed in grams of TEQ, and from the inventory it was found that the total emission of dioxins and furans of 314.7 g TEQ/year, which corresponds to 105 µgTEQ/person/year and 2.83 mg TEQ/km^2/year.

Most of these products were emitted to air (186.6 g TEQ/a). The total emission to residues was 120.1 g TEQ/a. Open burning of municipal waste and of agricultural residues are the main sources of emissions to air and residues. Wastewater dumping is the main source of UPOPs emissions into water.

The present assessment contains the first inventory of dioxins and furans in Liberia. The obtained results are based on data from 2004. The inventory was started in November 2004. The objective of the inventory was to identify the main sources of the release of the dioxins and furans and to quantify its magnitude.

The Stockholm Convention on Persistent Organic Pollutants establishes that the Parties should gradually reduce the emissions and where possible eliminate their sources. A periodic update of the inventory is an important activity, which can be used as indicator of the minimization of the emissions, to fulfill the international obligations.

The emissions factors used in the inventory are from the UNEP Standardized Toolkit. The main objective of the Toolkit is to assist the countries in their inventories. This Toolkit is an effective methodology for identification of all kinds of sources of PCDD/PCDF.

5.1.13 Calculation of Emissions

To evaluate the toxicity of dioxins and furans, the concept of Toxicity Equivalency Factors (TEF) is used. Each congener of dioxin has one TEF based on its specific capacity to produce effects. The 2, 3, 7, 8-TCDD – congener (tetrachlorodibenzo-p dioxin) is the most toxic and its TEF is 1. Other congeners receive fractions of one. The toxic equivalent (TEQ) is the sum of the concentrations of PCDD/PCDF multiplied by its specific TEF.

The annual emission of PCDD/PCDF is expected in grams of TEQ per year. For each source the emission is calculated from the following formula:

Annual emissions of dioxins = emission factor x activity rate.

The type of activity and technology used for each route (air, water, land, products and residues) determines the emission factor of each activity.

The emission factors are expressed in mass of TEQ per quantity or units of the material processed or final product.

The rate of activity corresponds to the amount of processed material or final product per year.

5.1.14 Inventory Compilation

After the estimation for sub-categories, the inventory is compiled as annual emissions in all sub-categories and categories for five potential routes. In the final stage, the emissions of 9 main source categories is summed and the national inventory, that is the total estimation of the emissions of dioxins and furans from all sources identified in the country. For the 10^{th} category (Hot Spots) the Toolkit does not give any emission factors. Emissions for Hot Spots are therefore not included in the calculation, but can be only qualitatively described.

5.1.15 Uncertainties in the calculations of emissions of PCDD/PCDF

The error evaluation is an essential element in the inventory of dioxins and furans. This information is not intended to invalidate the calculations, but to encourage future efforts in collection of more precise data that allow better calculations and achievement of more accurate results.

5.1.16 Results by category

Category 1: Waste incineration

Municipal waste incineration

There is no such activity in Liberia. Open waste burning system is prominent in open dumps, some of which are near residential areas.

Hazardous waste incineration

Liberia does not have incinerators for hazardous waste.

Medical waste incineration

Disposal of medical waste in small and poorly controlled incinerators were found to be a source of PCDD/PCDFs in the places investigated. Based on these experiences, thermal treatment of medical waste generates air pollution from hospitals in Liberia. Release to air is the predominant vector for medical waste incineration. Typically, medical waste is incinerated locally at the hospitals and other medical facilities in small furnaces with poorly constructed batch – type mode. In many cases, larger and centralized medical waste incineration facilities are operated only for eight hours a day and five days a week. Large and continuously operated medical waste incinerators are mostly found in Western Europe and North America..

Liberia has 6 kiln incinerators for medical waste, with the maximum capacity estimated to 15 t/year. The furnaces have semi-continuous, uncontrolled, poorly built batch type – mode combustion and no air pollution control (APC) system. The emission factors in this case are 40,000 µg TEQ/t to air and 200 µg TEQ/t to residues; resulting in total emissions of:

Table : Medical Waste Incineration

Type	Production t/year	Emission Factor (µg TEQ/t)		Emission g TEQ/t/year	
		Air	Residue	Air	Residue
Uncontrolled batch type mode, no APC system	15	40,000	200	0.600	0.003

There are no activities in Liberia that pertain to the other subcategories.

Category 2: Ferrous and non-ferrous metal production

Iron ore sintering, coke production, iron and steel production, copper production are not practiced in Liberia at this time.

Aluminium Production

Liberia has a few secondary aluminium factories, which use scraps. Their production is estimated to be 190 t/year according to the information from the few visited sites. As they use thermal processing of scraps, with minimal treatment of inputs and simple

dust removal, the emission factor to air is 150 µg TEQ/t and to residues 200 µg TEQ/t.

Table : Aluminium Production – Emission Factor

Type	Production T/year	Emission Factor µg TEQ/T		Emission g TEQ/year	
		Air	Residue	Air	Residue
Processing scrap Al, minimal treatment of inputs, simple dust removal	190	150	400	.029	.076

The other sub-categories have no importance for Liberia.

Category 3: Power generation and Heating

The power grid in Liberia has not been operational for years. Therefore, power generators are the only source of electricity. Small generators use gasoline, large generators use diesel fuel. The emission from these generators is calculated under Category 5 (Transport), since the emission factors are comparable to those of combustion engines in vehicles.

Heavy fuel oil is no longer used for power generation in Liberia.

The majority of people use firewood or charcoal for domestic cooking. The estimated consumption of wood used directly for cooking or converted to charcoal is 2 million tons per year. At an average hearting value of 15 MJ/kg the total heat production would amount to 30,000 TJ/year.

Table : Domestic Heating and Cooking

Type	Production TJ/year	Emission Factor µg TEQ/t		Emission g TEQ/year	
		Air	Residue	Air	Residue
Virgin wood or biomass fired stoves	30,000	100	20	3.0	0.6

Category 4: Mineral Productions

Gold and diamonds are still mined on smaller scales, but the emission from these activities is probably not significant. The Task Team could not access any of these mines.

Cement Production

There is one cement plant in Liberia, but it imports its materials.

Lime Production

The Task Team could not find any lime production in Liberia.

Brick Production

Liberia had several local brick plants before the civil war, but they are no longer operational.

Glass Production

A glass plant existed in Liberia but was shut down 14 years ago during the civil war.

Ceramics Production

There is no production of any major scale.

Asphalt Mixing

The estimation of the amount of asphalt was based on the import records. In 2005, it is reported that 800 m^3 of asphalt was imported (the conversion ratio was 2.5 tons of asphalt to 1 m^3).

The asphalt mixture is made on location without any APC control at the temperature of 140^{0}C.

Table : Asphalt Mixing

Type	Production t/year	Emission Factor µg TEQ/t		Emission g TEQ/year	
		Air	Residue	Air	Residue
No gas cleaning	2,000	0.07	ND	0.00014	ND

Category 5: Transport

Table : Transport – Potential Release Route

Potential Release Route					
Subcategories of main Category	Air	Water	Land	Product	Residue
Transport	x				
4-stroke engines	x				
2-stroke engines	x				
Diesel engines	x				x
Heavy oil fired engines	x				x

For the calculation of emissions generated in the transport category, the data from imports of fuel in 2004 were used, as there is no refinery in Liberia now, even though there was an active refinery plant in the country prior to the civil conflicts.

From 2004 import data it was estimated that 120,000 tons of leaded fuels and 1,400 tons of unleaded fuel were used in 4-stroke engines.

Table : 4-Stroke Engines

Classification	Consumption t/year	Emission Factor µg TEQ/t		Emission g TEQ/year	
		Air	Residue	Air	Residue
Leaded fuel	120,000	2.2	ND	25.87	ND
Unleaded fuel	1,400	0.1	ND	0.00014	ND
Total:	**121,400**			**25.87**	

About 2,400 tons of leaded fuel were used in 2-stroke engines.

Table : 2-Stroke Engines

Classification	Consumption t/year	Emission Factor µg TEQ/t		Emission g TEQ/year	
		Air	Residue	Air	Residue
Leaded fuel	2,400	3.5	ND	0.008	ND

According to the data from National Fire Service, in 2004 360,501 tons of diesel fuel were imported for transport, fishing ships, generators and so on.

Table : Diesel Engines

Classification	Consumption t/year	Emission Factor µg TEQ/t		Emission g TEQ/year	
		Air	Residue	Air	Residue
Diesel fuel	360,501	0.1	ND	0.018	ND

In 2004, 10,500 tons of heavy oils were imported.

Table : Heavy Oil

Classification	Consumption t/year	Emission Factor µg TEQ/t		Emission g TEQ/year	
		Air	Residue	Air	Residue
Heavy oil	10,500	4	ND	0.042	ND

Adding up the above subcategories, the total emission of Category 5 (Transport, including power generators) is 0.327 g TEQ/year.

Category 6: Uncontrolled combustion processes

Table : Uncontrolled Combustion Processes

Potential Release Route					
Subcategories of main category	**Air**	**Water**	**Land**	**Products**	**Residue**
Uncontrolled combustion process	X				X
Biomass burning	X	(X)	X		(X)
Waste burning and accidental fires	X	(X)	X		(X)

Waste Burning and Accidental Fires

Brush and forest fires, according to MOA, are not frequent in Liberia. However, agricultural waste burning is common. No official data on quantities burnt are available and, according to the Toolkit, the emission factors vary between 5 and 30 µg TEQ/t, depending on the amount of pesticides contained and the water content of the biomass. A conservative estimate of 1 million tons biomass burnt was used for this calculation.

Since no municipal waste incinerators exist in Liberia, household waste is burnt either domestically or in landfills. For this calculation it has been assumed that 100 kg of solid waste per person per year are burnt on open air (2/3 at homes and 1/3 in landfills).

Table : Uncontrolled Combustion

Classification	Production year	Emission Factor µg TEQ/t			Emission g TEQ/year		
		Air	Land	Residue	Air	Land	Residue
Agricultural waste burning	750,000 t/a	30	10		22.5	7.5	
Landfill fires	100,000 t/a	1000		ND	100.0		
Domestic waste burning	200,000 t/a	300	600		60.0		120.0
Accidental fires in houses	150 events/a	400		400	0.04		0.04
Accidental fires in vehicles	200 events/a	94		18	0.019		0.004

Accidental fire in houses and vehicles

The data from National Fire Brigade was not available. The assumption of 150 fires per year in houses and 200 vehicle fires per year was made based on comparison with other countries in the region.

Category 7: Production and use of chemicals and consumer goods

Chemical Industry: Presently, chemicals are not produced in Liberia.

Petroleum Industry: Currently the industry is not really operating.

Textile Industry: Currently all textile factories are closed.

Category 8: Miscellaneous

Table : Miscellaneous Activities

Potential Release Route					
Subcategories of main category	**Air**	**Water**	**Land**	**Products**	**Residue**
Drying of biomass	X				X
Crematoria	X	(X)	X		(X)
Smoke Houses	X	(X)	X		(X)
Dry Cleaning Residues	X	(X)	X		(X)
Tobacco Smoking	X	(X)	X		(X)

There are no crematoria in Liberia and only very few dry cleaners in the capital. Drying of biomass and smoking of fish are not practiced to any significant extent. Therefore the only activity to be considered in this category is tobacco smoking. While the Task Team has not been able to collect data on the number of cigarettes smoked in Liberia, it has made the assumption that 500,000 people smoke 20 cigarettes each per day.

Table : Tobacco Smoking

Classification	**Consumption per year**	**Emission Factor µg TEQ/t**	**Emission g TEQ/year**
		Air	**Air**
Cigarette smoking	3,600,000,000 pcs.	0.1	0.0004

Category 9: Disposal/Landfill.

Table : Disposal

Potential Release Route					
Subcategories of main category	**Air**	**Water**	**Land**	**Products**	**Residue**
Landfills and waste dumps		X			X
Sewage/ sewage treatment	(X)	X	X	X	X
Open water dumping		X			
Composting			X	X	
Waste oil treatment (non-thermal)	X	X	X	X	X

Based on data from other countries in the region the daily per capita generation of domestic wastewater was estimated at 100 liters. In urban areas this quantity is likely to be higher and in some places in the country it might be lower. For 3 million people the annual quantity of wastewater produced would be 0.1 tons x 365 x 3,000,000. Liberia does not have any wastewater treatment plants. Therefore 100% open dumping is assumed.

Table : Disposal/Landfill

Classification	Production t/a	Emission Factor µg TEQ/t	Emission g TEQ/year
		Water	Water
Open dumping of mixed domestic and industrial inputs	109,500,000	0.005	0.548
Waste oil disposal	10,000	4	0.04

Category 10: Hot Spots

Not all hot spots have been identified by the Task Team because many areas were not accessible during the inventory period. However, because of destruction of transformer stations and storage facilities during the war, a high number of contaminated sites has to be expected, which should be also considered as hot spots for UPOPs. A number of allegedly contaminated sites is listed in chapter 5.5. The other hot spots will have to be identified once the security situation allows safe access to all parts of the country.

Table : UPOPs Inventory – Annual release in g TEQ

No.	Main source categories	Air	Water	Land	Products	Residue
1.	Waste incineration	0.6				
2.	Ferrous and non-ferrous metal production	0.03				0.08
3.	Power generation an heating	3.0				0.6
4.	Production of minerals					
5.	Transport	0.35				
6.	Uncontrolled combustion processes	182.5		7.5		120
7.	Production/use of chemicals and consumer goods					
8.	Miscellaneous					
9.	Disposal /landfill	0.04	0.55			
	TOTAL g TEQ/a	259.1	547.5	10.0	0.0	450.7

Open burning of domestic and agricultural waste is by far the most important source of UPOPs releases to air and residues, while untreated domestic waste water is the only known significant source of UPOPs releases to water. However, the contamination of groundwater from hot-spots has not been investigated.

Information on the State of Knowledge on Stockpile, Contamination Sites and Waste, Identification, Likely Numbers, Relevant Regulation, Guidance, Remediation Measures and Data on Releases from Sites

5.1.17 Summary

The Task Team has not found major PCB contaminated sites but further inventories need to be done in inaccessible areas. During the war, all of the LEC's 16 substations were destroyed except 4 on Bushrod Island and 1 in Virginia.

About 28-35% of the estimated 3,000 - 4,000 transformers installed nationwide before the war are still left. In numerical terms, 840 - 1,400 transformers are available for further scrutiny. Some of their locations may constitute contaminated sites, since many transformers were targeted during the war and pierced by bullets or shrapnel. The Team also identified potential PCBs contaminated sites in the following areas:

- Paint Industry
- LPRC

- Fendell Campus (Stockpile)

5.1.18 Objectives

To conduct a preliminary review of the contaminated sites and stockpiles in the country, covering the legal, technical, and institutional aspects of their management.

5.1.19 Institutional Arrangement to Handle POPs Contaminated Sites

The roles of the EPA under the Act include the following:

- To serve as competent authority and receive all communications and documents;
- Make the findings of the scientific advisory committee available to decision-makers;
- Make available necessary information to the public;
- Inspect and evaluate contaminated sites,
- Establish a chemical Control Task Force for checking and screening of sites;
- Conduct Risk Assessments.

5.1.20 Some Major Potentially Contaminated Sites in Liberia

Table : Contaminated Sites

Organization	Contact person	Location	Date of work	Type of waste or chemical	Comments
LEC	Matthew Konai	Bushrod Island	11/04	a. PCBs stockpile b. Spilled oil	3 transformers, and others around Monrovia. 260 – 300 can be located
UL	Gono	Fendall	11/04	Mixed organic and inorganic chemical suspected	During and after the war these 21 containers have been stored here
Kakata Highway	Barclay	Near the 101 gas station	11/04	Transformers with PCBs and spilled oil	This was a major transformer station but is now used as a bathroom
Freeway	-	Jacob's Town	11/04	A few PCBs transformers	On poles high up
Old Road	-	Airfield Junction	11/04	Transformers station PCBs suspected	This was a major station for transformers
Paint Factory	Management	Caldwell Junction	11/04	Different additives chemicals	These additives may contain dioxins and furans by nature of work
Beer Factory	Management (ODELLA)	Bushrod Island	11/04	Different additives chemicals	Chemical expertise required
Kakata	Morris Kollie	BWI Campus	11/04	Transformers PCBS	Previously had workshops with different chemical needs

5.1.21 Preliminary Identification of Priority Sites

Table : Priority Contaminated Sites

No.	Name	Specific Area	Amount of Waste
1	Government Hospital (b) Merlin Health care	Grand Bassa County	average
2	Cem Clinic	Grand Bassa County	average
3	ACFI Clinic	Grand Bassa County	average
4	MSFH Day Care	Grand Bassa County	average
5	Brenda outreach clinic	Grand Bassa County	average
6	LAC Ware house and workshop waste stockpile	Grand Bassa County	average
7	UNMIL dump site	Grand Bassa County	above average
8	Buchanan parking station (b) Buchanan market house dump site	Grand Bassa County	above average
9	Tubman Street dump site	Grand Bassa County	above average
10	W.F.P. dump site	Grand Bassa County	average
11	Buchanan power plant site	Grand Bassa County	average
12	LIMINCO power plant site	Grand Bassa County	average
13	Camp dump site (LAC, Firestone, Liberia Farms)	Grand Bassa County	above average
14a.	LAC Hospital (Dump site)	Grand Bassa County	above average
14b.	Waterside dump site	Montserrado County	average
14c.	Palm cemetery (grave) site	Montserrado County	average
15	Suspected stockpile in barrel containers	Fendall main campus	above average
16	Stockpile of transformers near 101 Gas Station	Kakata High way	
17	DDT used to preserve Cola nuts	Pipeline road	
18	Dump site	Gobachove market area	above average
19	Dump site	Fiamah	above average
20	Dump site	Duala	average

5.1.22 Current Capacity and Experience

Training manpower is of high priority for capacity building of Liberian experts. Requests have been sent by the EPA to UNEP to address this need. Presently, trained manpower is scarce at the EPA. The few available experts are overloaded with work.

Materials and laboratory facilities with modern analytical equipment are needed as well.

5.1.23 Assignment of Responsibility and Liability

The Legislative Act creating the Environment Protection and Management Law of the Republic of Liberia was approved on November 26, 2002. Part V, Sections 69, 71 & 73 specially deal with Prohibition of Pollution by Emission, Pollution Emission License, and Register of Pollution Emission. Section 108 deals with Liability of Bodies, Corporations and Partnerships. In this particular section, the "polluter pays" principle is implied.

5.1.24 Overview of International Experience and Practices

The overview of the international experience and practices focuses on the possible remediation and management options of contaminated sites. Liberia has never had any scientifically based remediation strategy site management. An analytical laboratory is urgently needed. This will enhance EPA's capacities as compared to international standards and experience with other countries. With the proper experts, tools and equipment, the work can be done effectively.

5.1.25 Stakeholders involved in POPs contaminated sites

1. Monrovia City Corporation (MCC)
2. Ministry of Health and Social Welfare (MHSW)
3. Ministry of Foreign Affairs (MFA)
4. Ministry of Agriculture (MOA)
5. Environmental Protection Agency of Liberia (EPA)
6. University of Liberia (UL)
7. Liberia Electricity Corporation (LEC)

Summary on Future Production, Use and Releases of POPs - Requirements for Exemption

5.1.26 Summary

Protecting human health and the environment from harmful impact of Persistent Organic Pollutants (POPs) is the objective of the Stockholm Convention.

Article 5a (i) of the Stockholm Convention states that the Action Plan should include "An evaluation of current and projected releases, including the development and

maintenance of source inventories and release estimates, taking into consideration the source categories identified in Annex C". The source categories in Annex C include:

- Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/ PCDF)
- Hexachlorobenzene (HCB) (CAS No. 118-74-1)
- Polychlorinated biphenyls (PCB)

Article 15, 2a states that each Party shall provide to the Secretariat statistical data on its total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such data.

Article 15, 2b states that each Party shall provide to the Secretariat to the extent practicable, a list of the states from which it has imported each such substance and the states to which it has exported each such substance.

In Liberia, statistical data on production, import and export of chemicals according to Annex A and B of the Stockholm Convention is unknown. Also the repackaging of chemicals makes it difficult to implement article 15, 2b of the Stockholm Convention.

Almost all chemicals and substances entering Liberia are either repackaged or brought in through illegal cross border trade. Therefore, inventorying and the setting of database for chemicals in Liberia is difficult. The statistical data on the production, import and export of chemicals in Liberia may not be complete because of repackaging and the illegal cross border trade in these goods.

For Annexes A and B, Liberia has not, as of now, registered for exemptions. Liberia may in the future register for exemptions through the Secretariat when the need arises.

5.1.27 Detailed Forecast of Production and Releases of POPs

The Task Team could not confirm any current use of Annex A Part I pesticides and forecasts zero use and production for the future up to the year 2030.

With regard to the production of PCBs, the forecast is also zero, since Liberia has never produced PCBs. Since most PCBs are found in transformers and the power grid has not functioned for years, there are currently no PCB contaminated transformers in use. EPA got the information from the government that all transformers, with the exception of a few newer deliveries, which are PCB free, will be replaced, since most of them are damaged anyhow. The replacements will obviously be PCB free new transformers. Therefore, the forecast for PCB use till the year 2030 is also zero.

The forecast for legal use and production of DDT is also zero, since Liberia has never produced DDT and has banned the use of it, even for vector control.

The Task Team has not been able to produce a forecast for Annex C UPOPs, as Liberia's economic development over the next two decades is very hard to predict at this point, so shortly after the war and at a time when large parts of the country are still not safe. It can be expected that UPOPs emissions from power generation will rise as soon as the grid has been reestablished. When mining activities and mineral production will be resumed and enhanced, the emission values in the respective categories will go up. The growing number of vehicles will also increase emissions.

On the other hand, if garbage collection and proper disposal can be organized in the cities, open waste burning would be reduced, which is the single largest contributor of dioxin and furan emissions to air and residues. Equally, if sewage systems and wastewater treatment plants would be installed in urban centers, open water dumping into rivers and the Atlantic Ocean would go down and UPOPs emission to water could be reduced.

Existing Programs for Monitoring Releases and Environment and Human Health Impacts, including Findings

5.1.28 Summary

The Health Task Team was constituted in November 2004 as one of the components of enabling activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Liberia.

Its key mandates included:

a. Assessing the population's exposure to persistent organic pollutants;

b. Reviewing present activities and work done in the field of POPs in the country, and based on the preliminary information of the releases and contamination, spot-checking the population at selected sites; and

c. Identifying POPs related human health issues of concern, and conducting basic risks assessment.

In order to achieve the above objectives, the team visited approximately 40 institutions, including ministries and agencies of government, hospitals and clinics, funeral homes, laundries, garages, welding shops, paint factories, aluminum factories, foam mattress factories, sawmills, a cement factory, and dump sites. The below is the summary of findings:

1. Both government institutions and private organizations are involved in the use of POPs-related chemicals;

2. It was discovered that a local NGO is using dieldrin as agro-chemical in its agriculture projects in Nimba County, Liberia. Other institutions are using DDT illegally;

3. The Liberia Electricity Corporation (LEC) has four major transformers with large numbers of unit transformers totaling 515,950 kVA. These are accessible and can be counted. There are reportedly 3 to 4 major transformers in Buchanan, Grand Bassa County, where Liberia Mining Company (LAMCO) operated, which has yet to be verified.

4. At least 100 pieces of the Monrovia stock has been assessed as potentially PCB contaminated, because they have no label, nameplates etc. Even those with labels contained up to 0.5 ppm PCB at the time of delivery. Most of these transformers were purchased from Germany and Holland.

5. Hospital wastes are incinerated at temperatures lower than 800^{o}C and contain toxic elements along with surgical waste, which release dioxins during the combustion process. There are five hospitals in the Monrovia with incinerators. The chemicals used in hospital operations include sulfuric acid, hydrochloric acids, acetic acid, silver bromide, sodium bicarbonate, sodium meta-bisulphate, chlorine, Dursban, detergents, etc.

6. At most hospitals and health centers, wastewater is released into nearby swamps, while smoke from incinerators is blown into the air and the surrounding environment. Some waste products are dumped into swamps and rivers.

7. Funeral homes use formaldehyde in their operations. There are currently 7 funeral homes operating in various parts of Monrovia alone. Waste products are dumped into nearby swamps, where nearly all funeral homes are located.

8. Some institutions are involved in producing oil and water paints. Some of the chemicals used in these industries such as Polyol, methylene chloride, liquid chlorine, Caradate 80, Tegostay, Texaphor 963 may contribute to UPOPs generation in manufacturing processes or when disposed of.

9. At both paint and foam plants wastes, chemicals, and scrapped boxes are either burnt or dumped into swamps and nearby waterways, septic tanks, sewer lines, and/or buried.

10. General categories of wastes are dumped along riversides, into rivers, into mangrove swamps and wetlands along major streets in the city. These wastes include discarded X-ray films from hospitals, laboratory and surgical wastes, wastes from markets and commercial enterprises.

11. Garages and metal workshops fabricating machinery and equipment use carbide powder, electrolytes and oxygen.

12. The only cement company in the country has polluted the Somalia Drive environment with cement kiln emissions flying all around the communities. It has affected both human health and the environment. Residents from Billimah Community have filed an official complaint with the EPA. Also, poor vegetation in the area attests to the impact of the cement factory on the area.

13. Printing presses and plastic industries either were reluctant to inform the Task Team about the chemicals used in their establishments.

14. There is general ignorance and /or lack of understanding of POPs and their impact on human health and the environment.

5.1.29 Methodology

To facilitate its work, the team used a systematic approach, consisting of

a. Drafting a questionnaire;

b. Developing a work plan;

c. Visiting institutions and waste disposal sites;

d. Interviewing management, employees and other individuals where possible;

e. Reviewing medical and technical records;

f. Conducting follow-up activities;

g. Compiling data from institutions and inventories of waste sites;

h. Drafting a report from the compiled data.

5.1.30 Regulatory Background of POPs Monitoring:

Article 3 of the Stockholm Convention on Persistent Organic Pollutants calls on Parties to institute measures to reduce or eliminate releases from intentional production and use. Each party shall:

(a) Prohibit and/or take the legal and administrative measures necessary to eliminate:

i. Its production and use of chemicals listed in Annex A;

ii. Its import and export of chemicals listed in the same Annex;

(b) Restrict its production and use of the chemicals listed in Annex B.

The current regulatory and legal framework for POPs monitoring in Liberia is grossly inadequate. There are scanty standards on agro-chemicals, chemicals and pesticides applied by the Ministry of Agriculture, Ministry of Commerce, Industry and Trade, and Ministry of Health and Social Welfare. These standards and regulatory frameworks are general in nature, and do not specifically address POPs.

In order to adjust them to POPs issues, either new laws and policies should be enacted or certain changes made to satisfy the requirements of the Stockholm Convention.

5.1.31 Review of the Regulations

A. **Ministry of Agriculture**

The Ministry of Agriculture has no clear policy, law or standards on agro-chemicals, chemicals or pesticides used for agricultural purposes. Even the Act establishing the Ministry is not clear on the importation, exportation and use of agro-chemicals and pesticides.

It states under Article 28 subsection 28:2g: “that the agency will administer all laws relative to agricultural subjects or rural improvements, including regulatory laws designed to protect the farmer or agricultural means of production or farm commodities.”

While the Ministry ascribes to international rules and regulations governing agro-chemicals and pesticides, it has yet to develop a legal or regulatory framework, especially pertinent to POPs.

B. **Ministry of Commerce, Industry and Trade**

Like the Ministry of Agriculture, the Ministry of Commerce, Industry and Trade has no legal, policy and/or regulatory framework in place. However, it issues permits for the importation and exportation of goods and products for businesses and industries.

The Act establishing the Ministry gives it the right to set standards. According to the Act to amend the Executive Law with respect to the Ministry of Commerce and Industry, Section 5.3.2, subsection 651, the Ministry is given broad powers with respect to protection of the public interest and the achievement of national goals through the establishment and enforcement of standards for commodities and for trade: in the further execution of its junctions, it shall also: -

a. Establish and regulate commodity and trade standards;
b. Establish and enforce standards of business practices.

Although the mandate published since January 19, 1972 is clear, such standards and regulations are yet to be on the books, especially for agro-chemicals, chemicals and pesticides.

C. **Ministry of Health and Social Welfare**

The Ministry of Health and Social Welfare has operated by the Pubic Health and Safety Laws enacted since 1956 and revised only in 1976. The law addresses food and water quality control, sewerage, waste management, chemicals management and safety, pollution, and occupational health and safety issues, amongst others. The Act establishing the Ministry assigned among others the below responsibilities:

a. The prevention of the introduction and spread of communicable, infections and preventable diseases within the Republic of Liberia;
b. The promotion and conduct of research in the prevention and treatment of human diseases and the collection and compilation of pertinent statistical data;
c. Prevention and abatement of conditions hazardous to public health; and
d. Promotion of research, experiments, investigations and studies in the development of scientific methods for the diagnosis and prevention of social problems.

In addition to these three major institutions of government, which have been regulating chemicals policies and programs, a local group comprising chemicals and pesticides users, known as the Chemical Control Association of Liberia, is developing policies and working along with government institutions.

5.1.32 Current Monitoring Standards and Capacity for Monitoring of POPs Presence in the Environment

Article 11 of the Stockholm Convention on POPs calls on Parties to undertake appropriate research, development and monitoring initiatives at all levels pertaining to POPs, and where relevant, to their alternatives, including:

a. Sources and releases into the environment;

b. Presence, levels and trends, in humans and the environment;
c. Environmental transport, fate and transformation;
d. Effects on human health and the environment;
e. Socio-economic and cultural impacts;
f. Release reduction and/or elimination; and,
g. Harmonize methodologies for making inventories of generating sources and analytical techniques for the measurement of releases.

Present monitoring standards and capacities for POPs in the environment are largely inadequate and low for Liberia. The country lacks both the human resources, and material and institutional capacities to monitor POPs. For the institutions listed above, the current situation is described below:

Ministry of Agriculture

The Ministry of Agriculture has the Bureau of Plant and Animal Quarantine Services. Under the technical guidance of the Deputy Minister for Technical Services, it issues permits for the importation of agro-chemicals and pesticides used in the agriculture industry.

It also implements International Conventions such as those of IPPC and FAO - Policies.

The institution has no scientific testing facility in place, nor does it monitor the use of agro-chemicals and pesticides and pollutants. The only system of monitoring is the deployment of personnel at various points of entry to monitor incoming agro-products. This is in addition to the issuance of permits for importation.

The Ministry has two lists of banned and permitted chemicals. Agro-chemicals and pesticides permitted and banned include:

Table : MOA Banned and Permitted Chemicals

Permitted	Banned
Acephate azinphos - methyl	
Bensulide	2, 4, 5 – T
Chloropyrifos	Aldrin
Diazinor	Binapacry
Dicrotopas	Captafol
Dimethoate	Chlordane
Disulfoton	Chlorobenzilate
Ethion	DDT
Ethroprop	Dieldrin
Femmiphos	Heptachlor
Fenthion	HCH
Fonfos	Lindane (gamma –HCH)
Malathcon	Monocrotophas
Methyl - parathion	Parathion
Phorate	Paraquat
Phosmet	Benomyl
Methidathion	Benicarb
Isofenphos	Bromoxynil
Naled	Alachlor
Oxydemeton – methyl	Aluminum and magnesium phosphide
Pirimiphos	Captan
Profenophos	Carbofuram
Propetamphos	Endrine
Sulfotepp	Mirex
Temephos	Toxaphene
Terbufos	

Ministry of Commerce and Industry

The Ministry of Commerce has the Bureau of Foreign/Domestic Trade and Bureau of Standards. The Bureau of Standards has a small testing facility (laboratory). Its

capacity does not include chemical monitoring. Like the Ministry of Agriculture, this Ministry gives permits for importation and exportation of goods for the Liberian Commerce.

The Ministry has an inspectorate unit, which monitors commodities entering the local markets. There is no evidence of knowledge of chemicals and their effects on human health and the environment.

Ministry of Health and Social Welfare

The Ministry of Health and Social Welfare has the Division of Environmental and Occupational Health, which is charged with the responsibilities of regulating and monitoring environmental impacts resulting from pollution of air, water, food/feed, soil, all categories of wastes, sewage, occupational health and chemical safety, etc. The Division had a water quality laboratory prior to the war. This does not exist any more. No other material, systemic, or scientific capacity exists.

Recently, UNICEF Liberia provided the Division with a Water Quality Testing Kit and several quantities of Fendon for water treatment. The testing kit is yet to become operational. The Ministry is the DNA on the Rotterdam Convention, which is related to POPs. It has interim decision on imports of all POPs related chemicals listed under the Rotterdam Convention. Liberia requires Prior Informed Consent to the importation of chemicals under the Rotterdam Convention.

The Chemical Association of Liberia, which groups chemical users, does not have personnel formally trained in chemicals management or the technical expertise to assist the government in tracking POPs related chemicals.

5.1.33 Monitoring Institutions

Article 11 of the Stockholm Convention obligates parties to encourage and undertake appropriate initiatives at national and international levels. As stated above, the Ministry of Agriculture, Ministry of Commerce and Industry, and the Ministry of Health and Social Welfare are legally responsible to develop standards, or to test collected samples, etc. Unless otherwise clarified in other sector laws and policies, the responsibility to inspect polluting sources rests with the Environmental Protection Agency, the Ministry of Health and Social Welfare, Ministry of Lands, Mines and Energy, and the Liberia Water and Sewer Corporation.

5.1.34 Capacity Gaps

POPs management is new to Liberia, therefore capacity has yet to be built. The present UNIDO supported initiative is the first national effort in the area. The current survey revealed:

A. Human resources capacity

Some of the manufacturing and industrial institutions visited employ chemists, who merely perform chemical analysis of formulas used in their operations. These chemists have little or no knowledge of POPs. Chemists in the paint and foam

industries graduated more than 10 years ago, and have not had opportunity for advanced training, seminars and/or conferences.

B. Material Capacity

There are no monitoring equipments or laboratory facilities of significance to evaluate POPs effects/impacts on humans and the environment, or any other testing facilities. In institutions visited, no equipment for chemical analysis could be found.

C. Institutional Capacity

Institutions visited have yet to develop and/or update standards, laws or policies to respond to current realities, especially, regarding persistent organic pollutants and other potentially dangerous chemicals. Managers/owners of chemical institutions are not fully aware of the effects of these chemicals on human health and the environment.

The current practices, i.e. physical inspection/analysis of chemicals and pesticides at border points and even in establishments leave much to be desired.

5.1.35 Information on POPs Releases

The Task Team could not find any scientific evidence on the presence of POPs in the environment, food, feed, and humans. However, observations at more than forty institutions visited, produced some indications.

(a) Agro-chemicals and pesticides are used in the agriculture industry. A local NGO in Nimba County, Central Liberia, reported the use of dieldrin in its agricultural operation. DDT may still be used illegally in the health sector against malaria/vector control and in the agricultural sector.

(b) Cement kiln emissions are released into the air and the environment in the Somalia Drive Community. Agro-products and vegetations show visible signs of impact. Residents in Billimah Community have filed an official complaint to the Environmental Protection Agency (EPA).

(c) Chlordane and Dursban are used as insecticides at displaced persons centers and refugee camps around Liberia.

(d) Loggers, sawmills, and other wood users are suspected of using heptachlor. Residents spoken to in the area have reported respiratory problems. The loggers and lumber companies refused to disclose the names of chemicals used.

(e) Liberia Electricity Corporation transformers have over the years released PCBs in the environment, through oil spillages or leakage from decommissioned transformers.

Currently, there are no measuring equipments and standards to carry out analyses of chemicals and pesticides used by various industries. Usually, institutions are suspicious of officials of government entering their premises, and are not willing to provide information, even when it is in their own interest.

5.1.36 Health Related Assessment

Liberia is one of the developing countries, which is now beginning to initiate Enabling Activities on POPs. There has been no health related assessment or screening done before. There is also no information available on any research work done to determine health effects of POPs.

Current Level of Information, Awareness and Education among Larger Groups; Existing Systems to Communicate such Information to the Various Groups; Mechanism for Information Exchange with other Parties to the Convention

5.1.37 Summary

The April 30, 2003 Policy creating the Environmental Protection Agency of Liberia has sections devoted to public information education and awareness. Articles 2.3, 2.4 (f), 4.8 and 6.3 address information and education.

Also, the Environmental Protection and Management Law of Liberia enacted in April 2003 (Part XI, Sections 100-102) addresses information, education and public awareness. The policy and the law only address environmental protection in general, but not the issue of POPs in particular.

In order to enhance the process, questionnaires were used to do the interviews. In the few counties visited, namely Montserrado, Margibi, Grand Bassa and Grand Cape Mount, 650 persons were interviewed at academic institutions, government ministries, hospitals, communities, industrial areas, NGOs and commercial/business areas. Of this number about 10% had knowledge of POPs.

The Task Team members operated separately. For each individual or group of individuals interviewed, the member presented a letter from the Project Director's office to authenticate his/her mission.

The interviewees were selected by gender, age group and level of education. The team members briefly explained their mission and also about the Stockholm Convention and the 12 POPs and their effects on human health and the environment. Trade names were also used to identify the various POPs. Some of the interviewees stated that DDT was used to preserve kola nuts, dieldrin for killing fish in rivers and creeks, PCB containers (oil transformers) used as drums or buckets.

5.1.38 Overview of Public Information Policy and Practice Related to the Environment

The National Environment Policy of Liberia, enacted on April 30, 2003, includes a public information policy in 4 articles. Article 2.3d refers to the Policy Objective.

Article 2.4f refers to the key principles. Article 4.8 is devoted to Environment Information and Article 6.3 is devoted to Public Education and Awareness. Part XI, Sections 100 – 102 addresses information, access, education and public awareness.

This Law enables public participation and grants freedom of access to environmental information. The Environmental Protection Agency of Liberia (EPA) is responsible for collection, analysis and dissemination of environmental information. In consultation with the Ministry of Education, it should take appropriate measures for the integration in elementary and high schools, colleges and universities curricula of environmental education.

The information is disseminated by the Ministry of Information, Culture and Tourism (MICAT), local newspapers and the radio station of the Liberia Broadcasting System (LBS), which airs environmental programs. Other entities, such as the Association of Liberian Environmental Journalists (ALEJ), disseminates Environmental Information through the local daily newspapers.

The EPA has also established an Education and Awareness Section in the Agency. This Section will cater to the public, specifically to students to sensitize them for the environment and its many issues. It has a video system that was donated by UNDP. The library of the EPA lacks environmental educational material and trained personnel. This situation needs to be improved.

The 'Citizens Right to Know' mechanism is not yet in place. Concerning the 'Prior Informed Consent', Article 14.1a deals with information exchange, stating that each party should facilitate the exchange of scientific, technical, economic and legal information concerning the chemicals within the scope of this convention, including toxicological, eco-toxicological and safety information.

The Ministry of Health and Social Welfare has been the Designated National Authority (DNA) and Focal Point for the PIC Convention.

5.1.39 Present Public Information Tools and Mechanisms

Lectures, workshops, feature articles, environmental publications, media coverage, dramas, brochures and facts sheets are being used, but they are not POPs specific.

Liberia lacks environmental laboratories, experts, publications, wide access to the Internet and expertise in using websites such as CIEN, INFOCAB, ESTIS, and Global Information Network on Chemicals.

5.1.40 Requirements for Notices and Public Consultation Related to Environmental Impact Assessment (EIA)

Article 4.7 of the National Environmental Policy of the Republic of Liberia published on April 30, 2003, states that all development, socio-economic, and land use activities of any form have impacts on the environment to one degree or another. Therefore it is essential to assess and evaluate all on-going and future activities to determine the latitude of the possible impacts.

The Act creating the Environmental Protection and Management Law of the Republic of Liberia, enacted April 30, 2003 has a section on EIA (Part III) entitled "Environmental Impact Assessment, Audit and Monitoring".

These measures under Part III are in compliance with the requirements established under Section 37 of the Agency Act and provide a mechanism for balancing environmental concerns.

Environmental Awareness as Public Priority

As was earlier mentioned, a public survey was carried out for baseline knowledge on POPs. Since only 10% of the 650 persons interviewed knew about POPs, it must be concluded that the current information pathways, programs and practices are not effective.

The existing tools are not POPs specific but can be transformed to convey POPs messages and information.

Legislation versus Convention

Table : Comparison of the POPs Convention and Liberian Legislation

Obligation	Liberian Law	POPs Convention	Status
Create awareness among decision makers about POPs; create awareness among Policy makers	section 100, I.G.	Article 10.1	Yet to be done
Establish guidelines and principles for information gathering	Section 100, 1.H	Article 9.4	Yet to be done
Develop and implement Training and Education programs at national level	Section 102	Article 10.g	Yet to be done
Produce Public Registries	Section 101, 5	Article 10.5	Yet to be done

5.1.41 Chemical Contaminant and Pollutant Release Public Information Programs

Chemicals related information dissemination should include the following tools:

- Information on the effects of chemicals on health and the environment;
- Occupational Safety and Environmental Safety Measures;
  a. Safety Data Sheets
  b. Safety Reports
- Occupational training activities;
- Pollutant Release Transfer Registers (PRTRs); these can be distributed to the stakeholders and explained in workshops on PRTRs;

Other tools include:

a. The mass media
b. Guidelines or rules for chemicals and pesticide use
c. Talk shows
d. Lecture series
e. Theatre/drama performances

5.1.42 Mechanism for Information Exchange

- Information systems, such as CIEN, INFOCAB, ESTIS, GINC
- Basel Conventions Regional Centers
- Training courses, workshops, seminars and associated projects
- The Stockholm Convention Secretariat as the chief source of information
- National Focal Points of the Basel Convention, the Rotterdam Convention, the Intergovernmental Forum on Chemicals Safety (IFCS)

5.1.43 Examples of Public Information Products

1. Websites

   Information Networks on Chemicals
2. Environmental Publications, brochures and fact sheets
3. Theater/drama performances
4. Media

   Electronic

   Print
5. Conventions
6. Songs/music
7. Libraries

Relevant Activities of Non-governmental Stakeholders

5.1.44 Summary

The role of NGOs is very vital for the success of this Project because NGOs have more in-depth knowledge about the activities that take place in the communities. Women groups and those involved in the health programs of children have little idea/knowledge about POPs and the danger they pose to human health and the environment. According to Article 7, 2 of the Stockholm Convention they should be consulted. Other stakeholders, such as individuals and related NGOs and CBOs were assessed. According to Article (10.d.) of the Convention public participation should be promoted for the implementation of the Convention.

Few NGOs in Liberia are dealing with chemicals in general with very few dealing with POPs in particular.

Table : NGO and IO Activities

Pollution Control Association (POCAL) *Member of the International POPs Elimination Network (IPEN) and Health Care Without Harm (HCWH)* Joan Gbakoyah Center Street, Monrovia Tel: 06525675	Training Awareness raising PCBs inventories Waste management
Association of Liberian Environmentalist Journalists (ALEJ) *Member of the International POPs Elimination Network (IPEN)*	Awareness raising through the media Training of its members
Sustainable Development Promoters (SDP)	Awareness raising and sustainable agricultural practices, as they relate to agro-chemicals Training in local pesticides products and integrated pest management (IPM)
Chemical Control Association of Liberia (CHEMCAL)	Assessing various uses of some POPs pesticides and distribution channels of other POPs Research, monitoring and regulatory activities
FAO Liberia	Providing technical documents on pesticides to stakeholders, including farmers, NGOs and the Government Providing publications on pesticides management and obsolete stocks Training
Environmental Relief and Development Research Organization (ERADRO) Tommy Teah Buchanan Street, Monrovia Tel: 06533132	Awareness raising among policy and decision-makers
Pest Control Association of Buchanan Morris Joe Biafra Buchanan, Grand Bassa County	Training of local farmers Promoting animal welfare and pest control activities
The Liberia Marketing Association (LMA)	Awareness activities for pesticides dealers
Harbel Green Field Paul F. Gotolo Harbel, Camp #2, Margibi County Tel: 06524829	Integrated pest management without chemical pesticides
Promoting Activities for Development and Sustenance (PADS) Jacob E. Lablah Kakata, Margibi County	Trying to build sustainable local capacity of rural dwellers by teaching them IPM
Cotton Tree Agriculture Development (CTAD) Emmanuel L. Moore Cotton Tree Town, Margibi County Tel: 06551499	Community development

Overview of Technical Infrastructure for POPs Assessment, Measurement, Analysis, Alternatives and Prevention Measures, Management, Research and Development – Linkage to International Programs and Projects.

5.1.45 Summary

The primary objective of this Task Team was to assess Liberia's past and present activities involving the utilization of POPs and POPs-containing equipment, storage, facilities, emission, importation, sale and historical records, if any, as they affect or pose threats to human health. Also, efforts were directed towards the determination of the level of emissions at incineration, waste disposal and contaminated sites.

5.1.46 Waste Management Facilities in Liberia

Although industrial sources of POPs in most African countries are widespread compared to those of developed countries, the absence of requisite infrastructures, coupled with the lack of monitoring facilities, makes any form of industrial pollution significant. Hazardous waste management facilities, such as disposal sites including incinerators with incorporated catalytic converters, make the establishment of a technical base infrastructure of paramount importance in Liberia. During the assessment of existing waste disposal facilities, the team found out that disposal sites were mostly located within residential areas without proper restriction and management practices. At the major health centers, the team was able to evaluate and determine that structures for the incineration of medical wastes were far below standards and moreover, fumes which may contain dioxins and furans during incineration were released into nearby communities, and the general environment.

Pre-treatment of all forms of wastes is generally non-existent for Liberian industries, especially mining, agriculture and ceramic. Moreover, disposal wastes of relatively high organic loading and toxicity remain in the environment for a protracted length of time due to low organic removal efficiency. Not even engineered landfills permitted to accept hazardous waste have ever been constructed within the country. The only land filling method ever practiced is that of open swamp filling, which is unsustainable. Disposal facilities discussed above, i.e., open waste dumps, swamp filling and incinerators do not meet international standards. Regarding incinerator construction, either cement or dirt bricks are used. Capacities are generally less than eight cubic meters ($8m^3$) and cost is around US$50.00.

5.1.47 Contaminated Site Remediation Capability

Investigation proved that there are as many contaminated sites as there are communities. However, the primary ones, especially those suspected of containing and emitting POPs, are approximately 150.

Unfortunately, dedicated or specialized facilities, such as biological soil treatment, transportable treatment technology and specialized thermal, physical or chemical soil decontamination, are all lacking in Liberia. With the exception of direct incineration, which is also done in open air, waste treatment is left to natural processes.

As the records stand, there has been no remediation of any contaminated site. This is a serious problem. Some sites designated to be contaminated are presently being used for domestic purposes. Former substations of the Liberia Electricity Corporation (LEC) are being used as living quarters by displaced people due to lack of knowledge of the potential dangers of PCBs. Other residues and effluents emanating from these contaminated sites are being freely deposited into the environment.

In the absence of dedicated or specialized facilities, costs and capacities cannot be determined.

5.1.48 Environmental Monitoring Capability

Liberia with numerous activities and releases into the environment has no hazardous waste management and monitoring capabilities, facilities or services. Before the civil war the Ministry of Planning and Economic Affairs conducted project monitoring that was only for financial and developmental, not environmental purposes. The only attempt in this direction was made by the EPA, which was then called the National Environmental Commission of Liberia (NECOLIB). With funding from GEF/UNDP, participants from line ministries, agencies and educational institutions were trained in the field of Environmental Impact Assessment (EIA). There is no established environmental monitoring mechanism presently. Training and facilities are urgently needed.

Measurement of POPs will only be complete and reliable if our own facilities, such as the amount and type of equipment, measuring devices and adequately trained manpower are in place. However, the task team has been able to do assessment of some of the POPs (see report on dioxins and furan emission).

5.1.49 Health Monitoring Capability

The Ministry of Health and Social Welfare must be partner to the EPA for data sources and must be connected to International Medical Research Councils, and the World Health Organization (WHO) to boost the health monitoring capability to detect and assess origins of specific disorders that may result from POPs. For this, the funding from donors such as the GEF, UNIDO, UNEP, UNDP and the Government of Liberia would be required.

5.1.50 Technical Support and Releases Mitigation Services

In order for the NIP Implementation (POPs Enabling Activities) to be sustainable and well developed, the following must be addressed, because these are major constraints faced by EPA.

i) Logistics

ii) Infrastructure

iii) Public awareness

iv) Budget

v) Staff development

There exists no effective technology transfer between Liberia and other international partners, except for the recent effort of UNIDO initiating and facilitating the POPs Enabling Activities in Liberia. However, more is needed to be done to achieve satisfactory results.

5.1.51 Research and Development Assets

The effort of UNIDO has brought to light many deficiencies in the areas of research and development existing within the country, especially as they relate to the environment. Findings show that we should commit all universities to research and development. This can be made possible by providing incentives to these universities through national budgetary allocation from the government, and these institutions should work closely with the EPA. Currently, there is no research and development capacity on the issue of POPs within Liberia.

5.1.52 Information Management Capacity

One of the primary functions of the EPA is to provide the Liberian populace with all relevant information pertaining to the management of the environment, especially on releases of toxic pollutants, their potential health hazards and mitigation measures.

There is also the need for waste tracking or detection mechanism and equipment, aided by an effective Geographical Information System (GIS) integrated within the EPA. A continued absence of these will hamper efforts in the containment of POPs, especially where the pubic is concerned. Findings have shown that only a handful of Liberians are aware of potential dangers associated with POPs.

Table : Tabular Summary of Relevant Capacity Expertise:

Experts/Facilities	Focal Area	Capacity
Waste management experts	Waste	Training required
Waste management facilities	Waste	No infrastructure/equipments
Site remediation experts	Waste	None
Waste incinerators	Waste	None
Ambient air measurer	Pollution	None
Medical research analyst	Health	None
Environmental monitors	Environment	None
EIA specialists	Environment	Training required
GIS specialists	Chemicals sectors	Training required
Information specialists	Chemicals	Training required

Identification of Impacted Populations or Environments, and Management of Threats to Public Health and Environmental Quality and Social Implications for Workers and Local Communities

5.1.53 Summary

The Health Task Team was constituted in November, 2004, as part of the Enabling Activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants in Liberia. The key mandates in this second report are as follows:

- Reviewing present activities and work done in the field of POPs in the country;
- Based on the preliminary information of the releases and contamination, spot-checking the population at the selected sites;
- Identifying POPs-related human health issues of concern;
- Conducting basic risks assessments.

The team visited approximately 40 wastes sites and other places of interest and found:

- No POPs activities currently or previously ongoing could be proven;
- There are potentially toxic chemicals being used in the paint and foam mattress industries which cannot be verified as to their POPs relevance;
- Residue and wastewater from the use of these chemicals are either dumped into septic tanks, sewer lines, or released into nearby swamps and mangroves;
- The team identified assorted wastes being openly disposed of and burnt; these wastes sites are situated in populated areas in key parts of the city; these

wastes are washed away into nearby wetlands and streams during the rainy season;

- PCB release from transformers and capacitors from the various transformer sites managed by the Liberia Electricity Corporation;
- Similar release from Dura Plast, Liberia Inc., which manufactures PVC pipes and lines, oxygen and water tanks;
- Wastes from hospitals and clinics is incinerated in closed communities especially, the Redemption Hospital in New Kru Town, Bushrod Island, Monrovia, the SDA Cooper Hospital on 12th Street, Sinkor, and the St.Joseph's Catholic Hospital in Congo Town, Monrovia; these wastes include laboratory and surgical wastes, X-ray films and chemicals;
- Cement kiln emissions released into the air and soil along Somalia Drive, Freeway; a physical observation of this environment will convince the beholder;
- Lead and leaded substances from the Petroleum Refining Company, the Battery Factory, and the Paint and Foam Factories/Industries continue to seep into the soil and into water sources in the environment of these institutions;
- Some of the hospitals and all paint factories and foam businesses are located near swamps; releases from these institutions either go into the air or into swamps and waterways;
- Occupational and chemicals safety measures are inadequate in most institutions, and non-existent in others;
- Employees spoken to during the assessment mentioned death and deformity as a result of chemicals used;
- There is general ignorance of human health and environmental issues relating to POPs;

5.1.54 Methodology

The team developed strategies and a work plan in order to facilitate its work, including:

(a) Development of a questionnaire to facilitate the conduct of the assessment;

(b) Development of a work plan with detailed schedule and areas of visit;

(c) Visitation to institutions and waste disposal sites;

(d) Public interviews with various managements, employees, and individuals in institutions/communities, wherever possible;

(e) Review of medical/clinical and technical records;

(f) Follow-up activities;

(g) Compilation of data gathered from institutions and inventories of wastes sites;

(h) Drafting a report from the data compiled;

(i) Reporting to the Project Manager/EPA.

Article 15 of the Convention 2(a) calls on Parties to provide the Secretariat with statistical data on its total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such date, etc. Because POPs issues are new to Liberia, a pollutant release and transfer register has not yet been introduced. The periodic collection of information to allow tracking of trends, the use of common identifiers for chemicals, facilities and locations to facilitate comparison and aggregation of data, and the computerization of the information for easy analysis will all require capacity building in order to enable Liberia come on par with other countries in the global community.

5.1.55 Background on Potential Sources of POPs Impacts

The inventory exercise identified potential release routes. They include air, water, soil, food and feed. (See contamination report).

5.1.56 Current Occupational Safety Measures

Three institutions regulate occupational health in Liberia: the Ministry of Health and Social Welfare, the Ministry of Labor, and the National Social Security and Welfare Corporation (NASSCORP).

a. Ministry of Health and Social Welfare

The Public Health and Safety Laws provide for pre-employment examination, periodic examination during employment, and post-employment examination of public servants and employees of private institutions. The MOH's Division of Environmental and Occupational Health sets standards and issues certificates to those who annually satisfy the requirements. It also monitors and supervises activities in these institutions to ensure that they comply with the law.

The program has not come up with specific policies and guidelines, other than the provisions laid down in the Public Health Law. There is no national occupational health program, which will give the general public a clearer view of hazards associated with various occupations.

b. The Ministry of Labor:

The Ministry of Labor was established under the Peoples' Redemption Council (PRC) Government by Decree #35 to administer, promote, develop, direct and supervise all government programs and activities relating to labor.

Specifically, the labor laws take into consideration the following:

- Compensation for occupational injury
- Compensation for occupational diseases
- Compensation procedures

- Peaceful settlement of industrial disputes over issues, which are dangerous to national health, safety, security and the economy

c. National Social Security and Welfare Corporation:

The Act establishing the National Social Security and Welfare Corporation mandates the following:

- To develop, plan, organize, implement and administer the National Social Security and Welfare Scheme established by the Act;
- To administer the National Pension Fund, the Employment Injury Fund, and the Welfare Fund.

5.1.57 Potential Risk Groups

The potential risk groups are workers in the agricultural, industrial and mining sectors, communities living near hospitals where waste is incinerated, communities where the paint and foam factories are located, communities near the cement factory and along the freeway where Dura Plast manufactures oxygen, PVC pipes, and tanks, communities near the battery factory and petroleum refining areas as well as communities where open dumping of assorted wastes and open burning is done.

5.1.58 Institutions and Sites Visited

a. Government Institutions

1. Ministry of Health and Social Welfare
2. Ministry of Lands, Mines and Energy
3. Ministry of Rural Development
4. Ministry of Agriculture
5. Liberia Petroleum Refining Company
6. Liberia Water and Sewer Corporation
7. Liberia Electricity Corporation

b. Hospitals/Health Centers

1. John F. Kennedy Medical Center
2. Redemption Hospital
3. SDA Cooper
4. St.Joseph Catholic Hospital
5. ELWA Hospital
6. Mawah Medical Clinic

c. Funeral Homes

1. Samuel A. Stryker
2. St. Moses
3. A. B. Anderson
4. Good Shepherd
5. Two Brothers
6. Abraham Roberts
7. BTC/AFL Morgue

d. Industries

1. CEMENCO
2. LIPCO
3. Dura Plast Liberia Inc.
4. Battery Factory
5. National Paint Industries
6. Royal Industrial Complex
7. USTC
8. NABIL Enterprise
9. International Aluminum Factory
10. Metallum Liberia Ltd.
11. KamaPlast, Inc

ARI Cases

Table : ARI Cases seen at the JFK Medical Center from the 1995 to 2004:

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan.	119	96	210	314	141	218	118			289
Feb.	131	77	139	161	93	117	17			343
March	167	151	86	117	111	60	98			416
April	-	26	134	193	193	32	6			60
May	139	7	135	101	213	50	18			314
June	325	62	154	47	141	381	13			206
July	307	107	214	88	67	245	10			133
Aug.	377	117	131	100	180	43	84			311
Sept.	295	310	100	192	130	210	18			303
Oct.	366	310	121	311	134	34	70			
Nov.	334	319	96	219	121	33	268			
Dec.	176	338	180	180	93	184	474			
Total:	**2,736**	**1,923**	**1,700**	**2,023**	**1,617**	**1,607**	**1,194**			

System for the Assessment and Listing of New Chemicals

5.1.59 Summary

Liberia has still unacceptable gaps in knowledge, legislation, etc., resulting in inability to assess chemical risks in a standard and adequate manner in order to take preventive measures, similar to those taken by organizations such as the European Union (EU), UN and OECD that have of late strengthened their chemical programs.

The system of assessment of new chemicals does not only rely on importers and exporters, but on governments and authorities who have the responsibility of enacting or enforcing national legislation, providing general information on the responsibilities and liabilities of importers, exporters and users emanating from legislation and for monitoring of compliance and supervision. In Liberia, for instance, public institutions introduced hazards by changing containers of chemicals to avoid control without regard to international standards.

5.1.60 Chemicals Management

The aim of life-cycle management is sensible handling of chemicals by everyone who comes into contact with them and promotion of the development and use of safer chemicals. The management of chemicals is the continuous process of

assessing and reducing risk or the likelihood that a chemical will harm human health or the environment.

5.1.61 Information Requirements and Screening Criteria

The main impediments to efficient listing and management of chemicals depend on a country's level of development. In Liberia for example, the main problems are lack of serious political commitment, inadequate or uncoordinated legislation, uncoordinated multi-sectoral efforts, insufficient information on chemicals in use, lack of environmental monitoring, lack of trained staff, equipment and other resources, absence of labeling or labeling in foreign languages, faulty packaging or repackaging.

5.1.62 Capacity Gaps

According to the Stockholm Convention, Annex D, 1, a Party can propose a chemical to be listed as POP in Annex A, B or C, if chemical identity, persistence, bio-accumulation, and potential for long-range environmental transport can be documented.

At this point Liberia does not have the research capacity to provide scientific evidence for persistence, bio-accumulation and potential for long-range environmental transport of potential new POPs.

Relevant System for the Assessment of Legislation and Infrastructure

5.1.63 Summary

The major findings during the assessment of the current legislation on POPs related infrastructure started with inspections, interviews, questionnaires on POPs related institutions, industries and individuals. During these interviews, it was observed that the majority of stakeholders (90%) are not aware of any existence of Persistent Organic Pollutant (POPs).

It was also observed that stakeholders do not have employees trained in the handling, monitoring and management of POPs related chemicals/substances, by virtue of the fact that they themselves are ignorant of the existence of POPs in the country.

The process of collecting data was the most difficult task. Stakeholders were not cooperative and did not want to be interviewed. Many saw the questionnaires, interviews and the inspection of their facilities as a means of getting them out of their usual businesses, or apportioning blame.

5.1.64 Methodology of Data Collection Process

Methods used included field inspections and interviews using questionnaires.

Stakeholders (institutions, industries and individuals) consulted were as follows:

- University of Liberia
- United Methodist University
- AME Universit
- Cuttington University College (CUC)
- MARCO Trading Enterprises, Inc.
- Ministry of Justice
- Ministry of Health and Social Welfare
- J. J. Roberts United Methodist School
- National Quarantine Service
- Ministry of Agriculture

Areas visited during the process included:

- Fiamah Market
- Duala Market
- Redlight Market
- Waterside Market
- WestPoint Market
- Old Road Market

The work was organized in the three phases:

Phase I

The preparation of relevant questionnaires to enable the team collect data from stakeholders.

Phase II: Direct interview with the stakeholders and with individuals in public gatherings.

Phase III: The final phase was the group meeting to prepare a synopsis of the findings for the preparation of this report. It took almost thirty days to compile the inventory.

At the end of the Team's findings, it was observed and assessed that some of the stakeholders were apparently involved in the handling, use and some with the importation of the following:

a. Pesticides
b. Dieldrin
c. Chlordane

d. Solvents for refrigerator service

e. DDT

f. PCBs

It was also observed that some of the stakeholders have been dealing with POPs chemicals for more than twenty years.

5.1.65 Current Legislation

According to the assessment, there is no specific legislation on the production, import, export, monitoring, handling and management of POPs substances and waste.

Most of our stakeholders when contacted, had never heard of the Stockholm Convention. They pointed to the Ministry of Agriculture or the relevant agency of government that may have authorized the importation of chemicals and substances into Liberia.

There is no national regulatory framework for the disposal of POPs chemicals and no standard that may be applicable for the containment and disposal of POPs waste.

Although the national Legislative Assembly is aware of the international Conventions to which Liberia is signatory and the Legislation which brought about the establishment of the National Environmental Commission of Liberia (NECOLIB), now known as the Environmental Protection Agency (EPA) of Liberia, they do not seem to realize the need for enactment of legislation to meet the obligations under these conventions.

Therefore, there is no chemicals related regulation, hazardous waste regulation, or standard for reporting. The Liberian setting had not developed the reporting process to conventions and state bodies, enforcement practices, pollutants monitory, standards for pollutant measurements. Though the Environmental Protection Agency (EPA) is aware of the chemicals and hazardous wastes, there is no related regulation for enforcement.

5.1.66 Initial Observations and Capacity Gaps

Initial observation shows that many of the institutions, industries and individuals consulted were unaware of the existence of Persistent Organic Pollutant (POPs) even though many stakeholders were involved in the handling of POPs related substances and chemicals.

5.1.67 Preliminary Findings

- The majority of stakeholders is not aware of any activities of persistence organic pollutant (POPs).
- About 90% stakeholders do not have any employee(s) trained in the handling, monitoring and management of POPs.

- 70% of stakeholders have apparently been involved in the handling and usages of the following chemicals:

  Pesticides

  Agro-fertilizers

  Dieldrin

  Chlordane

  Solvents and industrial wastes

  DDT

- 72% of stakeholders have been dealing with POPs for more then ten years.
- 85% of stakeholders consulted do not have statutory mandates on the use of pesticides in their institutions, industries and work places from the Ministries of Agriculture, Commerce and Industry and Health and Social Welfare.No transport permits are obtained before chemicals are brought into the country.
- 90% of stakeholders disposed of POPs related chemicals by burning them underground (about 2 feet beneath the ground).
- The majority (80%) of stakeholders consulted relate to other institutions, industries, individuals, agencies of government, NGOs, INGOs, PVOs and CBOs in POPs related activities. They relate mostly in the area of sales, usage, import and transportation of POPs related chemicals. The process and relationships are based on business terms.
- No national regulatory framework for the disposal of chemicals exists in the POPs sector.
- There is no legal framework or policy that may be applicable for assignment of responsibility and liability for the containment and disposal of POPs wastes.
- 90% of stakeholders have very low capacity and experience in handling POPs.
- No legal framework exists, pertaining to the importation, manufacturing, transportation, distribution and storage of POPs related chemicals.
- No legal systems to monitor releases and environmental and human health impact from POPs related chemicals and substances.
- Besides the Environment Protection and Management Laws, there exists no Legislation on POPs related chemicals and substances.
- Only 20% of stakeholders have licenses of commercial rights for the handling of POPs pesticides or chemicals. The licenses obtained had no reference to any regulatory framework.

5.1.68 Capacity Gaps

There is no plan for strengthening the regulatory framework and the enforcement of a legislation related to the production, import, export, monitoring and the disposal

of POPs chemicals and substances. According to the Task Team, the enactment of a clear and defined legislation for the determination of the production, import, export, handling, monitory and management of the disposal of POPs will improve the situation. The law should clearly address the following issues:

a. Banning the importation of POPs related chemicals/substances into the country without the approval of the Environmental Protection Agency (EPA).

b. Importers must obtain licenses from the agency responsible to regulate and monitor chemicals and other POPs related substances regarding their importation, handling and management of disposal.

c. The legislation should include penalties and fines for institutions that import POPs related substances and chemicals without the approval of the responsible agency.

d. Institutions that store unfit POPs related chemicals should bear the responsibilities and liabilities for the damage to health and environment caused by these chemicals.

e. The legislation should clearly state the period institutions should store POPs related chemicals/substances, and who is responsible for safe disposal of their waste.

5.1.69 Current Capacity and Experience in the Field of DDT

For almost thirty years in the 1960s – 80s, DDT was used in rural Liberia as pesticide, but there is no inventory to show the quantity being used at the time. At this time, DDT is banned by the Ministry of Agriculture.

Provided Liberia asks for exemption to use DDT for disease–vector control use, in accordance with part II of Annex, Stockholm Convention, institutions which plan to deal with DDT should obtain a license from the Environmental Protection Agency (EPA).

These institutions will bear the liability for wrongful use and disposal of DDT waste. Institutions that are not licensed will bear the liability for illegally importing DDT into the country.

Identified Stockpiles of DDT and DDT Waste

Liberia has no stockpile of DDT and DDT waste according to the assessment of the Task Team. At present, there is no current national practice for DDT management. There are no legal retailers.

5.1.70 Institution and Regulatory Framework

The existing national institutions that collaborate with the EPA to regulate chemicals are the Ministry of Health and Social Welfare, the Ministry of Commerce

and Industry and the Ministry of Agriculture. According to assessments done, there were no regulatory measures and regulations governing importation and exportation of chemicals. The importation of chemicals was done in consultation with the World Health Organization.

The responsible agency, the Environmental Protection Agency (EPA), has no regulatory framework governing the management of the banned POPs pesticides, especially DDT. Such framework has yet to be established.

ANNEX 1: RELEVANT INTERNATIONAL AGREEMENTS AND COMMITMENTS

Name of Treaty	Date of Liberia's Accession
Montreal Protocol on Substances that deplete the Ozone Layer, Montreal 1987	March 31, 1993
United Nations Framework Convention on Climate Change, New York, 1992	Jan 6, 1995
Convention on Transboundary Movement of Hazardous Waste and their Disposal (Basel Convention) Basel, 1989	January 23, 2003
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Rotterdam, 1998	August 20, 2002
Stockholm Convention on Persistent Organic Pollutants, Stockholm, 2001	Signed (May 23, 2002
Convention on Wetlands Ramsar, Iran 1971	November 2, 2003
Cartagena Protocol on Biosafety January 29, 2000	
Convention to Combat Desertification Paris,1994 (UNCCD)	April 2002

ANNEX 2: POPS PROJECT NATIONAL COMMITTEE (PNC)

1. Ministry of Planning
2. Ministry of Health & Social Welfare
3. Ministry of Agriculture
4. Ministry of Finance
5. Ministry of Commerce
6. Ministry of Land, Mines & Energy
7. Ministry of Defense
8. University of Liberia
9. Pollution Control Association of Liberia (POCAL)
10. Association of Liberia Environmental Journalist (ALEJ)
11. Chemical Control Association of Liberia (CHEMCAL)
12. Environmental Protection Agency (EPA)
13. Liberia Electricity Corporation (LEC)
14. Ministry of Justice
15. Ministry of Internal Affairs
16. Hon. Commany B. Wisseh –NTLA, Capital Hill, Monrovia
17. Commissioner of Customs, Ministry of Finance
18. Hon. Harrison Slewon Sr. Capital Hill, Monrovia
19. L.P.R.C
20. FAO
21. Ministry of Education

ANNEX 3: POPS PROJECT STAKEHOLDERS

1. Ministry of Planning and Economic Affairs
2. Ministry of Health and Social Welfare
3. Ministry of Agriculture
4. Ministry of Finance
5. Ministry of Commerce and Industry
6. Ministry of Land, Mines and Energy
7. Ministry of Defense
8. Ministry of Justice
9. Ministry of Education
10. Ministry of Internal Affairs
11. Ministry of Transport
12. Ministry of Foreign Affairs
13. Liberia Marketing Association

14 A.M.E. University

15. United Methodist University
16. Don Bosco Polythenic
17. Tubman Technical College
18. J.J Roberts High School
19. B.W.I.
20. University of Liberia
21. UL-Department of Agriculture
22. UL-Department of Geography
23. Cuttington University College
24. O.T.C. (Logging Company)
25. LEC

26. L.P.R.C.
27. Gutrude Rubber Plantation
28. ANARCO Trading Ent.
29. Inland Group of Companies
30. NARDA
31. SDP
32. Royal Paint
33. Battery Factory
34. Green Farm
35. Chemical Control Association of Liberia
36. Firestone Rubber Plantations Company
37. Green Advocate
38. ERADRO
39. POCAL
40. Beer Factory
41. CEMENCO Company
42. FAO
43. Environmental Protection Agency
44. ADRA-International
45. National Port Authority
46. Ministry of Information
47. Pets Control of Buchanan
48. Pets Control Assoc. of Buchanan
49 Cotton Tree Agriculture Development Project
50. Harbel Green Field

ANNEX 4: EXPERT TASK TEAMS

Task Team for Health

1. Jonathan Davis	EPA
2. Amos Yaugoldmer	POCAL
3. Wilfred Gortor	MOH/SW
4. Gloria Stevens	JFK
5. Oscar Vanyamba	Rural Development

Task Team for Education and Public Awareness

1. Isaac C. Yeah	ALEJ
2. Jacob Bright	Clar TV Station
3. Boakai A. Cooper	MICAT
4. James S. Karbbar	Ministry of Education
5. Tarpeh L.U. Sayee, Jr	POCAL Actors
6. Katherine E. Y. Sawyer	MAP Actors
7. Tommy Teah	ERADRO

Task Team Contamination and Emission

1. Prof. Neing Ehn Kelulah	EPA
2. Joseph N. B. Jimmy	Ministry of Commerce
3. Eugene S. Caine	MCC
4. Torsou Jallabah	UL
6. Arthur R. Tucker	FAO
7. Tugbeh C. Tugba	UL

Task Team for Research

1. Joseph James	CHEMCAL
2. Johnny Lincoln	Ministry of Commerce
3. Clara Brooklyn	ANARCO Trading Ent,
4. Moses Toe	Buchanan Pest Control
5. Matthew F. Konai	LEC
6. Lemuel T. Browne	Ministry of Planning and Economic Affairs

Task Team for Legal Issues

1. Prof. David L. Wiles	UL (Geography Department)
2. Cllr. Dexter Tiah	Henries Law Firm (Benson Street)
3. David Kollie	A.M.E University
4. Johnson Leaman	Ministry of Defense
5. Bibiana Blay	Ministry of Justice

ANNEX 5: TERMS OF REFERENCE FOR TASK TEAM MEMBERS:

CONTRACT DOCUMENT

UNDER THE PROJECT,

The Task Team members will work under the supervision of the National Project Coordinator to prepare technical reports containing detailed information on the present state of the particular field of POPs under scrutiny. The Task Teams will develop comprehensive work plans with budgets and appoint team leaders to coordinate the compilation of inventories and to produce draft reports according to the below TORs, and timeframe.

TERMS OF REFERENCES

1. RESEARCH TEAM

The Research Team will:

- Compile inventories on Annex A, Part 1 Chemicals, Annex A, Part II, Chemicals and Annex B Chemicals.
- Undertake inventories on production, export, import, Polycholorinated Biphenyls (PCB) containing equipments and other POPs. This will be compiled from authorities such as the LEC, Ministry of Agriculture, Ministry of Commerce, Association of Liberian Industries, other ministries, and NGOs, research and academic institutions as well as other relevant stakeholders.

2. CONTAMINATION/EMISSION EXPERT TEAM

This Team will:

- Conduct inventories on stockpiles, contamination sites, waste and assess disposal opportunities,
- Conduct inventories on releases of Annex C chemicals;
- Collect data from the Research Team and calculate total emissions based on nationally developed factors or international standards.

3. LEGAL EXPERT TEAM

This Team will**:**

- Produce a system for the assessment and regulation of chemicals already in the market.
- Produce a system for the assessment and listing of new chemicals.

- Assess the infrastructure and enforcement capacity to ensure compliance of the institution involved in the POPs management including regulatory controls

- Assess the monitoring and R & D capacity in Liberia.

4. HEALTH EXPERT TEAM

This Team will:

- Identify POPs related human health issues of concern and conduct basic risk assessments.

- Assess the population's exposure to POPs

- Assess threats to public health and environmental quality and social implications.

- Monitor environmental and human health impacts.

5. EDUCATION AND PUBLIC AWARENESS

This Team will:

- Developed a national strategy for information exchange, education, communication and awareness raising

- Prepare action plans for

- Awareness raising among policy and decision makers with regards to POPs

- Awareness raising among the general public regarding information on POPs.

EXPECTED OUTPUT

- Country base-line information is collected and compiled in regards to POPs.

- Preliminary POPs inventories and assessments of national infrastructure and capacity conducted.

TIME FRAME

The tasks will be performed within a six months period, commencing November 2004 to April 2005.

November 2004 – February 2005	Production of first draft of Inventory Report
	Strategy and Action Plan on POPs proposed
March 2005 – April 2005	Satisfactory completion of consultancy assignments
	Strategy and action plan on POPs management produced.

Signed: _____ Neing-Ehn Kekulah

Head of Contaminated Sites Task Team

_____ Cllr. Dexter Tiah

Head of Legal Task Team

_____ Mr. Jocob Bright

Head of Education Task Team

_____ Mr. Jonathan Davies

Head of Health Task Team

_____ Matthew Konai

Head of Research Task Team

ANNEX 6: STRATEGIES AND ACTION PLAN ELEMENTS OF THE NIP (2006-2010)

Policy Statement and Commitment

In the course of developing the NIP, a resolution was adopted by the participants at a multi-stakeholder meeting, endorsing proposals for POPs management and committing to their implementation. The resolution is contained below:

5.1.71 Resolution to endorse the National Implementation Plan

We, the stakeholder in the Republic of Liberia, on the implementation of the NIP on POPs in the Republic of Liberia see it as a logical elaboration of international initiatives undertaken on the path from Rio-92 to the World Summit on Sustainable Development (Johannesburg, 2002) at which consideration was given to discussion of challenges of environmental and human protection.

Actions performed within the initiatives are aimed at:

1. Realization of international coordination development targets stated in the Millennium Declaration;

2. Increasing safety level for chemical use, thus facilitating poverty reduction and protection of the most vulnerable groups of the population, as well as ensuring ecosystem integrity;

3. Formation of stable partnerships at all the levels of decision-making on chemicals and waste, including pesticides and persistent organic pollutants.

Considering the necessity to minimize and prevent the unfavorable impact of chemicals to human health and the environment in conditions of on-going expansion of spheres and scopes of POPs production and use, including pesticides, the Republic of Liberia ratified a number of international conventions in the area of chemical safety and took responsibility for the implementation of the country's obligations within the frames of and protocols.

The Stockholm Convention on Persistent Organic Pollutants was acceded to on May23, 2002.

With the view of achieving sustainable development and sound chemical and POPs management in the Republic of Liberia, the following actions were recommended by the stakeholders for implementation in the framework of the NIP.

In the area of legislation, it is necessary to raise the efficiency and perform actions aimed at the improvement of the entire system of legislative regulation on chemical and POPs management with the active involvement of all the concerned parties, thus achieving a more advanced level of coordinated actions;

In the area of information maintenance and exchange, there is a necessity to optimize the programs and methods of information collection on chemical safety for all

concerned parties in order to achieve optimal use of available resources, such as personnel capacity, technical and organizational infrastructure.

Considering the importance of information exchange/sharing and appropriate dissemination, as well as the necessity to ensure information access to the stakeholders under the current conditions of limited capabilities it is essential to undertake the following actions:

- to arrange and ensure information exchange/sharing between the authorized bodies of state governance, general public and other concerned parties

- to create and ensure functioning of the national chemical safety web-page:

- to provide access to existing international systems, globally harmonized systems for classification and labeling of POPs and related chemicals.

In the area of education considering the importance of training and re-training of the personnel aimed at strengthening the capacity and development of the infrastructure, it is necessary to initiate the development and implementation of special training for task team members and related stakeholders.

In the area of monitoring and control, it is necessary to initiate actions aimed at strengthening the interrelation and optimization of monitoring programs, facilitate the development of technical and scientific and methodical potential, enable implementation and use of a regulation system, taking into account the constantly supplemented list of POPs, improve information exchange/sharing between the various system and organizations responsible for control and implementation and, as required, to initiate programs on capacity building with the involvement of national and international experience.

In the area of capacity building for chemicals and POPs management it is essential to perform actions aimed at coordination of current programs, to initiate integrated capacity building programs, ensuring scientifically substantiated approaches to POPs involved in production and consumption, development and implementation of low waste-free technologies and further progress of scientific and technological capacity on handling, use and elimination of POPs.

In the area of international cooperation, in order to adapt and implement the experience gained by the international community in concern of improvement of tools on chemicals and POPs management, it is necessary to widen the sphere of participation of the Republic of Liberia in multi-lateral international agreements regulating the issues of POPs and pesticides management.

In order to achieve the goals of the World Summit on Sustainable Development and the Stockholm Convention, it is necessary to implement the National Implementation Plan.

Taking into account the necessity to solve the urgent and first-and-foremost problems on chemicals and POPs management, it is expedient to integrate the top-priority actions aimed at solution of first-priority tasks in the sphere of POPs use in order to secure humans and the environment into currently developing programs and plans in

the areas of human health and environmental protection, in particular, into the National Action Plan for implementation of the Stockholm Convention till 2020,

Recognizing the importance of the NIP in enhancing the national effort towards the sound management of POPs, we the stakeholders agree to support the production and implementation of the program of the NIP outline therein.

Signed: _____

Date: _____

Place: _____

Area of focus: Governance/Legal

DEVELOPMENT OBJECTIVE

To develop comprehensive legislation to support an integrated approach to POPs/chemicals management, which will be achieved within five years

IMMEDIATE OBJECTIVES

- ★ To satisfy the obligations of international conventions
- ★ To address gaps in POPs management
- ★ To regulate chemicals not managed by existing legislation
- ★ Review and develop legislation for transport and storage of dangerous chemicals

Activity	Issues addressed	Expected Output	Implementers	Cost US$	Time frame
Develop a national program for the management of medical waste	★ The lack of programs for the management of medical waste adds to the problem of dioxin and furans emissions ★ A core network of experts to conduct risk assessment should be established ★ Medical waste plan and policy should be developed ★ Reduce low-tech incineration of medical waste	★ Medical waste plan and policy finalized and developed ★ Medical waste low-tech incineration is reduced ★ Lower emissions of Dioxins and Furans from medical facilities ★ National medical waste management program improved	EPA, MOH, Law Firms, UNICEF	150,000	Jul 07 - Jan 09
Develop a plan for reduction of open garbage burning with provision for alternatives in areas without garbage collection	★ Open combustion of domestic and agricultural waste is by far the most important source of UPOPs emissions to air in Liberia ★ Garbage collection is not available in many areas ★ Liberia does not have municipal garbage incinerators or safe landfill sites	★ Amount of garbage collected is recorded ★ Proper planning document is produced ★ Plan is implemented ★ Alternatives are produced	EPA, MCC, UNICEF, MLME, POCAL, ALEJ, CEEP, LSI	200,000	Nov 07 - Nov 09

DEVELOPMENT OBJECTIVE

To develop comprehensive legislation to support an integrated approach to POPs/chemicals management, which will be achieved within five years

IMMEDIATE OBJECTIVES

- ★ To satisfy the obligations of international conventions
- ★ To address gaps in POPs management
- ★ To regulate chemicals not managed by existing legislation
- ★ Review and develop legislation for transport and storage of dangerous chemicals

Activity	Issues addressed	Expected Output	Implementers	Cost US$	Time frame
Ensure implementation of relevant international Agreements and other Protocols	★ National legislation for the implementation of relevant Agreements on POPs and other chemicals missing	★ Legislation for the implementation of the Stockholm and Rotterdam Conventions and other protocols enacted	National Focal Points, Convention Secretariat, Ministry of Foreign Affairs, EPA, NCCTF, ICM	200,000	Jan 07 - Jan 10
Adopt the GHS	★ National legislation not compliant with GHS requirements	★ GHS anchored in Liberian law	Bureau of Standards, Liberia Customs, Ministry of Health, CHEMCAL, EPA	50,000	Nov 06 - Apr 07
Develop regulations for export, import, transport and storage of hazardous chemicals management including pesticides and PCBs	★ Policy document and regulations for hazardous chemicals management lacking	★ Regulations for hazardous chemicals management produced	EPA, MOH, NCCTF	15,000	Jul 07 - Dec 07
Develop a national policy program for the sound management of POPs	★ National policy not defined ★ No guidelines and regulatory framework existing	★ National policy on POPs produced ★ Compliance strengthened	EPA, law firms, Green Advocates, MOJ, MPEA	20,000	Jul 07 - Dec07

DEVELOPMENT OBJECTIVE To develop comprehensive legislation to support an integrated approach to POPs/chemicals management, which will be achieved within five years	**IMMEDIATE OBJECTIVES** ★ To satisfy the obligations of international conventions ★ To address gaps in POPs management ★ To regulate chemicals not managed by existing legislation ★ Review and develop legislation for transport and storage of dangerous chemicals				
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Produce a Clean Air Act for Liberia	★ Liberia does not have a Clean Air Act ★ Lack of standards for the quality of ambient air ★ Lack of emission standards	★ National Ambient Air Quality Standard for Liberia established ★ Air pollution emission standard defined ★ Air emission control and regulatory mechanism in place	EPA, MOH	10,000	Jan 08 - Jun 08

Area of focus: Risk Reduction/Health

DEVELOPMENT OBJECTIVE To facilitate the collection and analysis of data on the exposure of the Liberian population and its environment to POPs chemicals	**IMMEDIATE OBJECTIVES** ★ To strengthen the poisoning incidence surveillance program ★ To establish a pesticide residue monitoring program ★ To increase the level of awareness and access to various sources of information on the hazards of POPs ★ To identify priority chemicals				
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Conduct detailed assessment of POPs and POPs related chemicals used in the country and their impact on health and the environment	★ Health implications of POPs on humans have not been assessed ★ Level of exposure of humans and the environment is not know ★ POPs victims are not identified	★ Levels of exposure to POPS is known ★ Preventive measures can be taken	EPA, MOH, LEC, NCCTF	20,000	Jan 08 - Jul 08

DEVELOPMENT OBJECTIVE

To facilitate the collection and analysis of data on the exposure of the Liberian population and its environment to POPs chemicals

IMMEDIATE OBJECTIVES

- ★ To strengthen the poisoning incidence surveillance program
- ★ To establish a pesticide residue monitoring program
- ★ To increase the level of awareness and access to various sources of information on the hazards of POPs
- ★ To identify priority chemicals

Activity	Issues addressed	Expected Output	Implementers	Cost US$	Time frame
Develop a database and register for chemicals, indicating their hazards	★ Currently no national database for chemicals available	★ Chemicals registry and database developed	MOH, CHEMCAL, MLME, Chemical Industry, Academia, EPA, MOA	10,000	Nov 06 - Mar 07
Establish a health and environment surveillance program	★ Currently the status of public health and environment is not systematically monitored	★ Central Health Committee established ★ Pesticide Residue Monitoring Committee established ★ National laboratories accredited	MOH, EPA, MOA	5,000	Dec 06 - Jan07

Area of focus: Capacity Building, Technical Cooperation, Education and Awareness

DEVELOPMENT OBJECTIVE To build the capacities of stakeholders in Liberia to better respond to issues related to POPs Chemicals		**IMMEDIATE OBJECTIVES** ★ To produce management development programs and instruments ★ To produce information and awareness mechanisms			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Conduct a training workshop/seminar on hazardous chemicals and POPs contaminated sites	★ Most Liberians chemists are not knowledgeable about POPs contaminated sites and POPs as a whole ★ Training, logistics infrastructure and equipments are inadequate ★ Local experts are not adequately trained	★ Skills of POPs experts upgraded ★ Contaminated sites identification process explained	EPA, LEC, POCAL, UL, MOH, MOA, MCC	20,000	1 – 15 Jan 07
Conduct training for laboratory technicians	★ Trained laboratory technicians are insufficient in Liberia ★ Skills in analytical, sampling and monitoring techniques are lacking ★ Technicians are not trained to use modern laboratory equipments	★ Technical and human needs including training logistics, equipment and infrastructure are secured ★ Laboratory technicians are trained in analytical, sampling and monitory techniques	EPA, UL, MOH, MOA, MLME	20,000	Jul 07-Dec 07

DEVELOPMENT OBJECTIVE To build the capacities of stakeholders in Liberia to better respond to issues related to POPs Chemicals		**IMMEDIATE OBJECTIVES** ★ To produce management development programs and instruments ★ To produce information and awareness mechanisms			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Establishment of a chemical laboratory or upgrading existing laboratories	★ Laboratories are not functioning ★ Laboratory technicians are not adequately trained ★ Exposure levels of POPs cannot be properly tested and verified ★ Laboratories lack quality standards	★ Functional chemical laboratory in place ★ Laboratory technicians are trained to do POPs/chemical analysis ★ Exposure levels of POPs can be determined ★ Laboratories are equipped with adequate instruments and reagents	UL, EPA, MLME, CUC, MOA	200,000	Jan 07 - Dec 07
Facilitate an international training workshop on contaminated site remediation	★ Contamination Task Team members and engineers have little knowledge about remediation ★ Technical input/human resources lacking	★ Skills in site remediation upgraded ★ Task Team members and engineers are trained in site remediation	EPA UL, LEC, MLME, MOA, MCC	18,000	Oct 07 - Dec 07
Establish a data base on POPs and related chemicals in Liberia	★ Liberia does not have a POPs and chemicals registry ★ Access to information on POPs is limited	★ POPs and chemicals registry produced ★ Reference point for POPs established ★ Data base on POPs established	EPA, MOH, MOA, CHEMICAL, MPEA, UL	8,000	Ma 07 - Jul 07

DEVELOPMENT OBJECTIVE To build the capacities of stakeholders in Liberia to better respond to issues related to POPs Chemicals		**IMMEDIATE OBJECTIVES** ★ To produce management development programs and instruments ★ To produce information and awareness mechanisms			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Conduct a UNEP training course on chemical websites usage and purchase the required computer equipment	★ Limited knowledge of chemical website use by stakeholders ★ Information exchange techniques are limited ★ Insufficient computer equipment and Internet access	★ Knowledge and information on chemicals increased ★ Up-to-date information on POPs and other chemicals are accessible ★ National information exchange is strengthened	EPA, MOE, MOI CEEP, POCAL, HARDA	20,000	1 – 15 Jul 07
Launch POPs public education program and produce training courses and materials for the public and educational institutions on POPs management	★ Attitudes and behavior in POPs generating and management need improvement	★ POPs education and training materials produced and used ★ Attitude and behavior in POPs management are changed	CEEP, UL, EPA, ERADRO, MAP, Talking Drum, EPA-Environ-link, POCAL	60,000	Jan 07 - Jan 09
Develop plans for outreach public education and training on POPs and other chemicals	★ A plan needs to be developed for workshops, website activities and education of target audiences	★ An education outreach and training plan is produced	EPA, MOE, CEEP, MOI, POCAL, MAP, BAP, MPEA, FTP	25,000	Dec 06 - Apr 07

DEVELOPMENT OBJECTIVE To build the capacities of stakeholders in Liberia to better respond to issues related to POPs Chemicals		**IMMEDIATE OBJECTIVES** ★ To produce management development programs and instruments ★ To produce information and awareness mechanisms			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Conduct a workshop on waste management and draft a waste management plan	★ Amount of solid waste generated, behavior and attitude towards generation and disposal needs to be changed ★ Mitigation mechanism on the destruction of the environment by POPs waste is of paramount importance	★ Chemical and solid waste management plan is produced	MCC, EPA, ERADRO,POCAL, LMA, UNICEF, MLME	10,000	1 – 15 May 07
Print/produce fact sheets on POPs	★ Limited knowledge on POPs ★ Absence of POPs publications ★ Public awareness is minimal ★ Public information dissemination mechanism is inadequate	★ Knowledge about POPs is increased ★ Educational and information dissemination tools are produced ★ Public awareness fact sheets are produced and distributed nationwide	POCAL, CEEP, EPA, ERADRO, MOI, ALEJ, CHEMICAL, MOE	11,000	Jul 07 - Dec 07
Facilitate international and local education and training workshops and courses for Task Team members	★ Capacity of Task Teams is not fully developed ★ Access to educational resources is limited ★ Limited POPs experts ★ Local training centers, human resources and materials are lacking	★ Task team members are trained ★ Educational resources are made available ★ Training centers are upgraded ★ Curriculum is updated	UNIDO, UNITAR, EPA, MOE, UL	40,000	Jan 07 - Dec 10

DEVELOPMENT OBJECTIVE To build the capacities of stakeholders in Liberia to better respond to issues related to POPs Chemicals		**IMMEDIATE OBJECTIVES** ★ To produce management development programs and instruments ★ To produce information and awareness mechanisms			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Produce and perform POPs awareness drama and films/movies	★ Citizens are not aware of the dangers of POPs ★ Harmful effects on humans and the environment unknown ★ Scope of awareness needs to be widened ★ Community awareness activities on POPs need to be enhanced	★ Harmful effects of POPs are known ★ Community awareness activities are promoted and implemented ★ Awareness activities cover the whole nation	MAP, POCAL, MOI, BAP, FTP, TDS	100,000	Jan 07 - Dec 10
Erect POPs awareness bill boards	★ Visual information on POPs is non- existent ★ Awareness raising mechanism lacking ★ Government printing facilities degraded	★ POPs Visual Aids are produced and distributed nationwide ★ Government facilities are made viable and their capacity is increased	CEEP, Eviron-Link, EPA, MOI, MOE	4,000	Jan 08 - Dec 08
Produce POPs education and awareness radio and TV programs	★ As awareness is low, a large number of audience should be reached ★ Government radio station needs to be upgraded	★ Government news media is involved in environmental issues ★ Most Liberians are aware of the danger of POPs	MOI, EPA, POCAL, TDS, MAP, CEEP, ALEJ, ELBC	12,000	Jan - Dec 07
Produce POPs newsletter	★ Written materials on POPs hardly exist	★ POPs newsletter is produced ★ POPs awareness is increased	EPA, Environ-Link, ALEJ, CEEP, MOE, MOI	5,000	Jan 07 – Dec 07

DEVELOPMENT OBJECTIVE To build the capacities of stakeholders in Liberia to better respond to issues related to POPs Chemicals		**IMMEDIATE OBJECTIVES** ★ To produce management development programs and instruments ★ To produce information and awareness mechanisms			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Produce "Citizen's right to know" booklets on POPs	★ In regards to POPs, citizens have limited knowledge and information about their rights. ★ Right-to-know principle as endorsed in agenda 21 needs to be implemented	★ "Citizen's rights to know" booklets are produced ★ Citizens are educated on their rights regarding to POPs	EPA, MOJ, Green Advocates Law Firm	15,000	Oct 07 -- Mar 08
Conduct a national awareness workshop on POPs	★ Level of awareness about POPs among the general public is very low	★ Level of awareness among the general public is increased ★ Dangers of POPs are known ★ Citizens are adequately sensitized	EPA, CEEP, POCAL, ALEJ, MOI, MAP	15,000	1 – 15 Sep 07
Produce academic curricula on POPs and related chemicals	★ Academic curricula do not include POPs ★ Textbooks for students about POPs do not exist	★ POPs and related chemicals are included in relevant academic curricula	EPA, MOE, UL, CUC	20,000	Apr 07 - Aug 07

DEVELOPMENT OBJECTIVE To build the capacities of stakeholders in Liberia to better respond to issues related to POPs Chemicals		**IMMEDIATE OBJECTIVES** ★ To produce management development programs and instruments ★ To produce information and awareness mechanisms			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Conduct training of healthcare waste handling staff	★ Low number of waste management operators ★ Low number of locally trained incinerator operators ★ Low number of healthcare waste handlers ★ Knowledge about the danger of POPs inadequate	★ Sufficient number of healthcare waste handlers trained ★ Sufficient number of waste management operators and incinerator operators are trained	EPA, MOH, WHO	10,000	Feb 09 - Mar 09
Conduct national workshop on POPs policies	★ Stakeholders are not involved in designing POPs policies	★ Stakeholders educated on POPs ★ Complaints on POPs are addressed ★ Stakeholders involvement in policy formulation increased ★ POPs policy document produced	EPA, Law Firms, MOJ, Green Advocates	10,000	1 – 15 May 07
Conduct workshops on chemical agreements, programs and activities	★ There is little communication and coordination between agencies involved with international chemical agreements ★ Efforts are sometimes either conflicting or duplicated	★ Synergies between chemical agreements improved ★ Platform to establish linkage developed	EPA, Convention Focal Points, MOJ, MPEA, FAO	15,000	1 – 15 Apr 07

DEVELOPMENT OBJECTIVE To build the capacities of stakeholders in Liberia to better respond to issues related to POPs Chemicals		**IMMEDIATE OBJECTIVES** ★ To produce management development programs and instruments ★ To produce information and awareness mechanisms			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Conduct a workshop on POPs and other chemicals for customs and immigration officers	★ Monitoring and enforcing mechanism strengthened ★ Import control in place ★ Transboundary movement of chemicals is controlled	★ Movement of chemicals controlled ★ Smuggling is curtailed/controlled ★ Import of chemicals is properly monitored	EPA, Convention Focal Point, MOA	15,000	1 - 15 Mar 07
Workshop on international collaboration in regards to national chemical policy	★ Involved agencies have few international contacts and little experience in dealing with multinational organizations	★ Chemicals policy practiced by ICM ★ Effective coordination in regards to chemicals	EPA, NCCTF, MPEA	10,000	Jan 08
Facilitate international education workshop/training courses for legal experts	★ Liberian jurists have little experience with regulating hazardous chemicals	★ Legal experts trained in the design and application of chemicals policies and regulation ★ Chemical policy formulated and application	EPA, UNIDO, MPEA	100,000	Jan 07 - Dec 10
Conduct foreign training/fellowships for PCB researchers and experts	★ Liberia does not have any PCB experts ★ There are no well equipped laboratories for PCB analysis in Liberia	★ PCBs experts trained ★ National capacity of PCBs researchers upgraded ★ Skills in PCBs analysis acquired	UNIDO, FAO, EPA	100,000	Jan 07 - Dec 10

Area of focus: Assessment of the POPs Situation and POPs Inventories

DEVELOPMENT OBJECTIVE

To get a complete picture of POPs sources, storage facilities and contaminated sites and keep the inventories current

IMMEDIATE OBJECTIVES

- ★ To complete the pesticides inventory
- ★ To complete the PCB inventory
- ★ To refine the UPOPs inventory
- ★ To design a mechanism for inventory updating
- ★ To identify and evaluate the contaminated sites
- ★ To prioritize the issues and estimate remediation costs
- ★ To produce a National Chemicals Registry

Activity	Issues addressed	Expected Output	Implementers	Cost US$	Time frame
Conduct an in-dept assessment/study of the POPs situation in the 15 counties of Liberia once they are safely accessible	★ There is insufficient data on POPs ★ Situation on POPs unclear ★ Line ministries have not sufficient knowledge of POPs	★ Capacity of line ministries is built ★ Adequate information on the POPs situation is available ★ In-depth assessment completed in the counties	EPA, LEC, MOH, MOD, MME, CHEMICAL	30,000	Jan 07 - Oct 07
Conduct national inventory of POPs sources of emissions and releases	★ Emission sources of POPs have not been adequately assessed ★ Systems of waste disposal have not been properly verified and documented	★ National inventory of POPs sources completed	EPA, CHEMICAL, MOH, MLME, POCAL, MOJ, MOA, ERADRO, MCC	10,000	Jul 07 - Dec 07
Conduct a national inventory of sites contaminated by POPs and other chemicals	★ Contaminated sites have not been identified	★ Chemicals/POPs contaminated sites are identified ★ Risks associated with chemical exposure are better understood	EPA, MOH, MLME, LEC, CHEMICAL, POCAL	100,000	Jan 08 - Dec 08

DEVELOPMENT OBJECTIVE

To get a complete picture of POPs sources, storage facilities and contaminated sites and keep the inventories current

IMMEDIATE OBJECTIVES

- ★ To complete the pesticides inventory
- ★ To complete the PCB inventory
- ★ To refine the UPOPs inventory
- ★ To design a mechanism for inventory updating
- ★ To identify and evaluate the contaminated sites
- ★ To prioritize the issues and estimate remediation costs
- ★ To produce a National Chemicals Registry

Activity	Issues addressed	Expected Output	Implementers	Cost US$	Time frame
Conduct an in-depth assessment of dioxins and furans emission from open waste burning	★ Open burning of domestic and agricultural waste is done on a large scale in Liberia ★ Health implications have not been assessed	★ Magnitude of open waste burning is known ★ Health implications of open burning is adequately assessed	EPA, MOH, MCC, POCAL, UL, ERADRO	5,000	May 07 - Oct 07
Provide prevention methods against the generation of UPOPs	★ Domestic and agricultural waste are burnt on open air and on landfill sites ★ Medical waste is combusted in inadequate incinerators	★ Enforceable disposal laws in place ★ Alternative disposal methods in place ★ Reduction in open domestic garbage burning	MCC, EPA, MOJ, MOA, MOH	100,000	Jan 08 - Dec 08
Identify and evaluate medical waste incinerators	★ Number of incinerators not sufficient ★ Methods of medical waste disposal inadequate	★ Medical waste incinerators identified ★ Medical waste disposal methods assessed	EPA, MCC, POCAL, ERADRO, LSI	15,000	Jan 07 - Jul 07
Establish a database for stocks of unwanted and obsolete pesticides	★ Currently no data on pesticide stocks available	★ Database for pesticides established	EPA, FAO, NCCTF	10,000	Jan 08 - Jul 08

DEVELOPMENT OBJECTIVE

To get a complete picture of POPs sources, storage facilities and contaminated sites and keep the inventories current

IMMEDIATE OBJECTIVES

- ★ To complete the pesticides inventory
- ★ To complete the PCB inventory
- ★ To refine the UPOPs inventory
- ★ To design a mechanism for inventory updating
- ★ To identify and evaluate the contaminated sites
- ★ To prioritize the issues and estimate remediation costs
- ★ To produce a National Chemicals Registry

Activity	Issues addressed	Expected Output	Implementers	Cost US$	Time frame
Undertake a detailed analysis of the PCBs situation	★ Since not all areas in Liberia can be accessed safely, the PCB inventory could not yet be completed by the Task Team	★ Database established ★ PCBs inventory completed, including containers and equipment ★ Storage and disposal options determined	LEC, EPA, FAO	30,000	Jan 08 - Jul 08
Conduct risk assessment of PCB contaminated sites	★ Since the PCB inventory could not yet be completed, the risk of the potentially contaminated sites has not been assessed	★ Health risk assessed ★ Risk of exposure reduced	EPA, MOH, MLME	12,000	July 07 - Jul 08
Produce a National Chemical Registry	★ No chemicals register exists currently in Liberia	★ Chemicals classified and registered ★ POPs registered	EPA	10,000	May 08 – Sep 08

Area of focus: Remediation

DEVELOPMENT OBJECTIVE

To dispose of POPs stockpiles and contaminated equipment and containers, eliminate new sources and clean up contaminated sites

IMMEDIATE OBJECTIVES

- ★ To dispose of PCBs and PCB contaminated equipment and containers
- ★ To dispose of POPs pesticides and obsolete pesticides, as well as contaminated equipment and containers
- ★ Take measures to reduce the generation of UPOPs
- ★ Identify and remediate POPs contaminated sites

Activity	Issues addressed	Expected Output	Implementers	Cost US$	Time frame
Undertake clean-up of contaminated sites	★ Contaminated sites have not been identified ★ No clean-up operation has been done ★ Technical and human resources are not adequate to undertake remediation of sites	★ Contaminated sites are cleaned up ★ Health hazards reduced ★ Technical inputs are provided	EPA, LEC, MLME, POCAL, MOH, MCC, MOJ, MOA	100,000	Jun 08 - Dec 08
Collection and storage of POPs contaminated equipment and containers	★ Stockpiles have not been identified	★ Stockpiles of contaminated equipment are identified and safely contained ★ Reduction in health hazards	LEC, EPA, MOH, MCC, MOJ, MPW	200,000	Jan 08 - Jun 08
Establish safe storage sites for POPs pesticides and other unwanted pesticides	★ Currently the existence, location and conditions of pesticide storage sites are not even known	★ Safe storage sites established ★ POPs pesticides and obsolete pesticides contained	EPA, MOH, NCCTF, FAO, MOA	100,000	Jun 07 - Jun 08

DEVELOPMENT OBJECTIVE To dispose of POPs stockpiles and contaminated equipment and containers, eliminate new sources and clean up contaminated sites		**IMMEDIATE OBJECTIVES** ★ To dispose of PCBs and PCB contaminated equipment and containers ★ To dispose of POPs pesticides and obsolete pesticides, as well as contaminated equipment and containers ★ Take measures to reduce the generation of UPOPs ★ Identify and remediate POPs contaminated sites			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Establish and maintain safe PCB storage sites	★ There are no dedicated safe storage sites for PCBs	★ Safe PCB storage sites constructed ★ PCB containing materials are safely contained	LEC,MCC, NCCTF, EPA, MPW	200,000	Jan 08 - Dec 08
Removal, storage and disposal of obsolete PCB containing transformers	★ There are several storage sites for decommissioned transformers in Liberia, but the are not up to standard ★ Many transformers are out of service but still in their service location ★ Many transformers have were cannibalized during the war	★ Storage sites constructed or upgraded ★ Transformers stored and subsequently disposed of	LEC, MPW, NCCTF, EPA	250,000	Jan 09 - Dec 09

Area of focus: Research, Monitoring and Reporting

DEVELOPMENT OBJECTIVE To establish effective monitoring and reporting mechanisms		**IMMEDIATE OBJECTIVES** ★ To determine the levels of POPs and other dangerous substances in the Liberian environment ★ To ascertain progress in the NIP implementation			
Activity	**Issues addressed**	**Expected Output**	**Implementers**	**Cost US$**	**Time frame**
Conduct research and monitoring programs in various environmental media	★ Currently ambient air is not monitored for any type of chemical pollution and no soil, water or food samples are tested	★ Levels of POPs in environmental media is known ★ Potential for exposure in soil, water, air and food sediments is known ★ Ambient air and other environmental samples are tested	EPA, ICM, UNIDO, NCCTF, MOA, UL	200,000	Jan 07 - Dec 10
Conduct an annual progress performance evaluation of the NIP implementation	★ The Stockholm Convention requires the performance of the NIP to be evaluated	★ NIP implementation measured against performance indicators	EPA, UNIDO	50,000	Jan 07 - Dec 10

Area of focus: Resource Mobilization

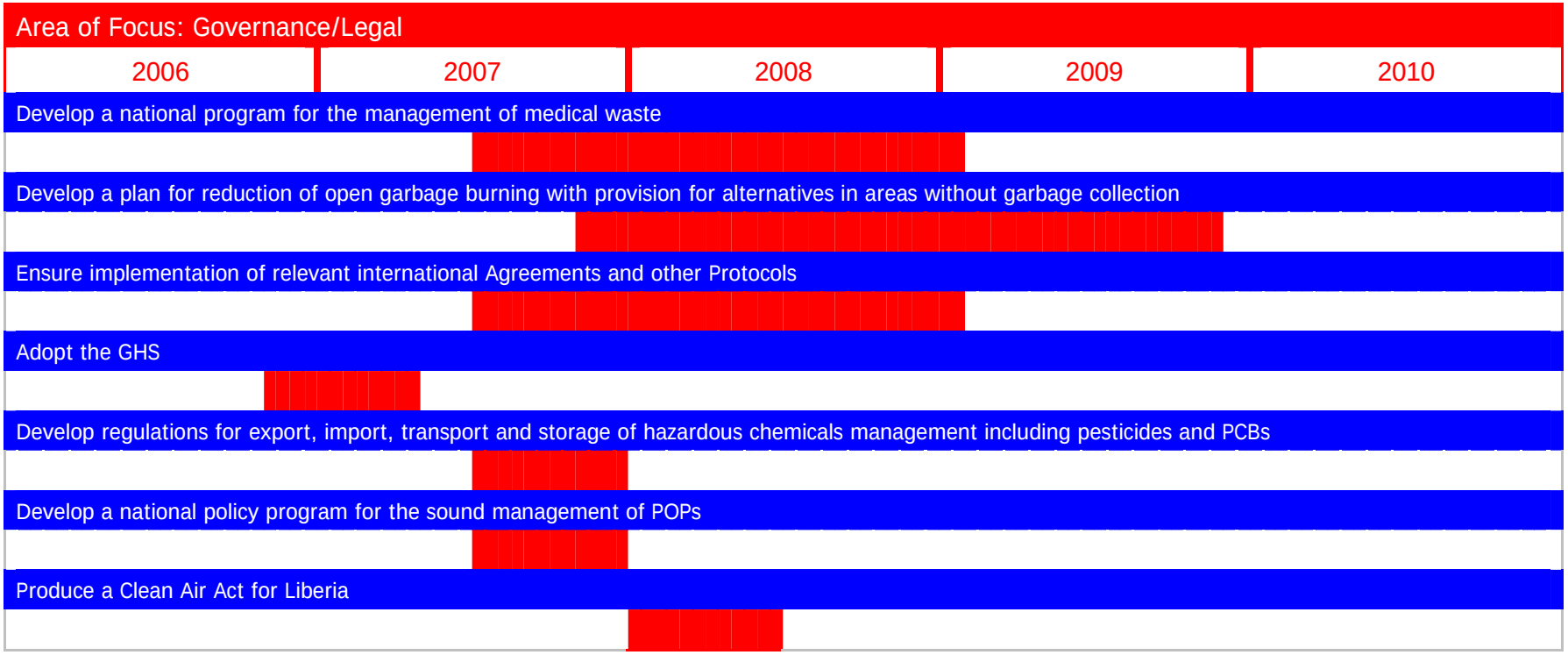
DEVELOPMENT OBJECTIVE

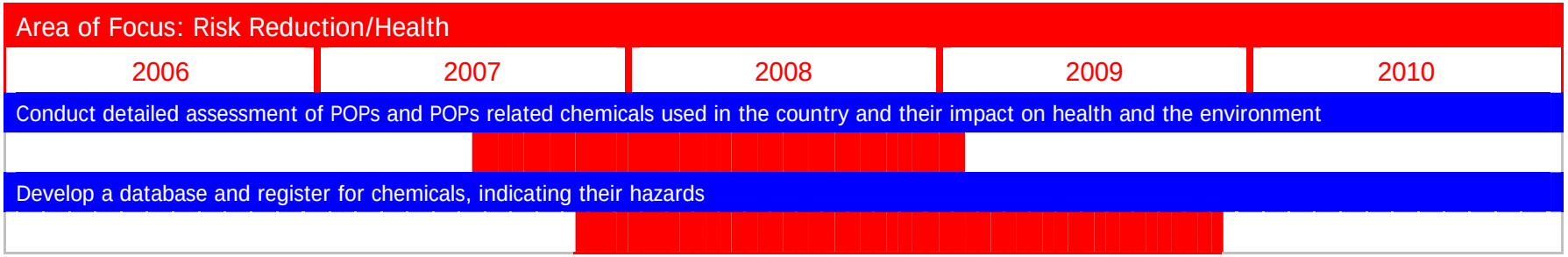
To identify and engage financial sources to facilitate the NIP implementation

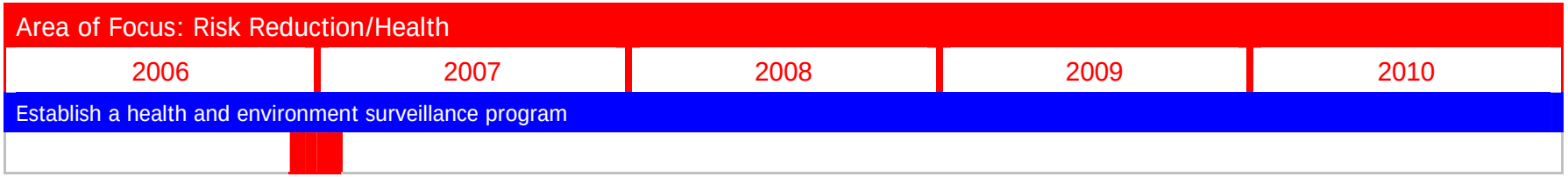
IMMEDIATE OBJECTIVES

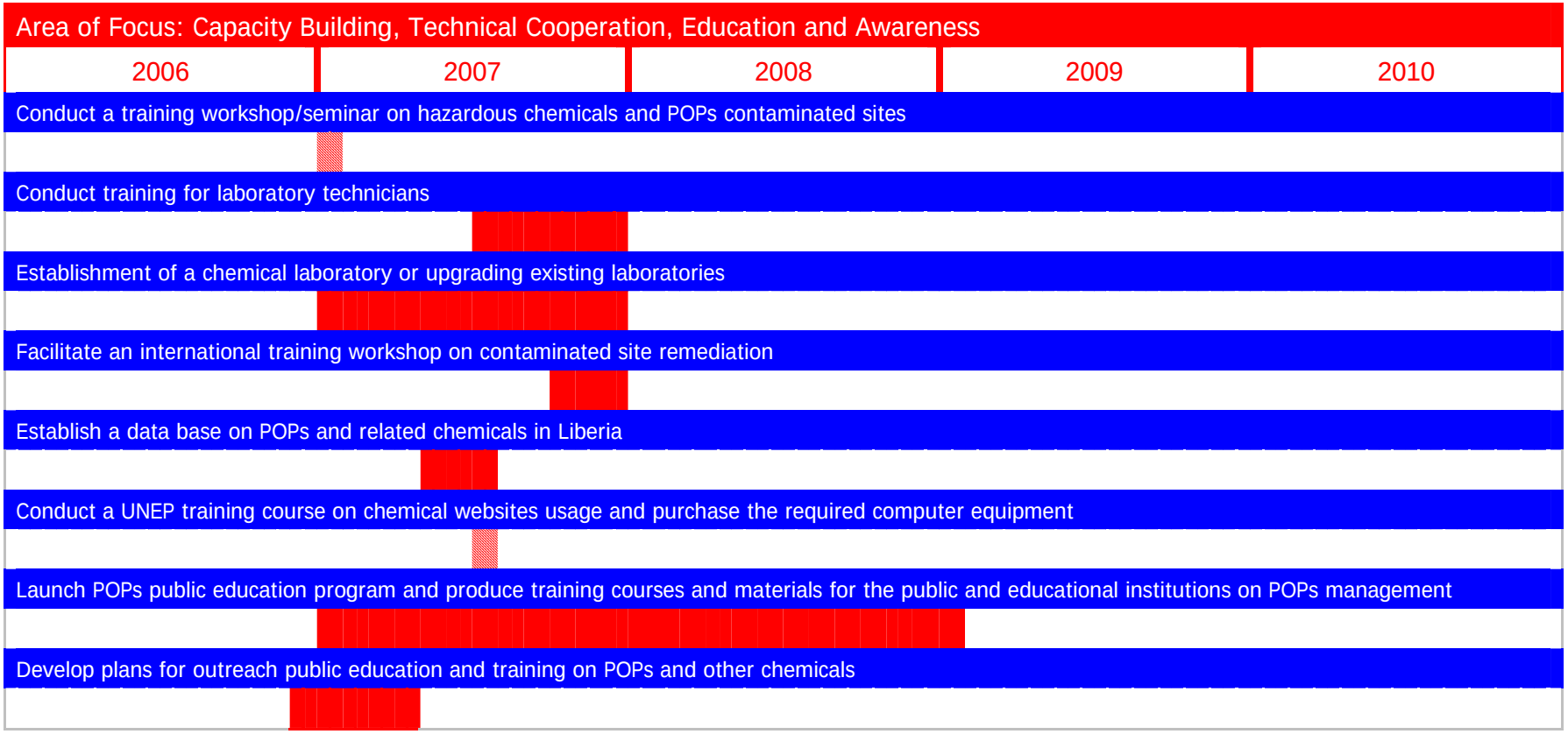
- ★ To do comprehensive donor tracking
- ★ To convince donors of the feasibility and benefits of Liberia's NIP
- ★ To produce project proposals for funding

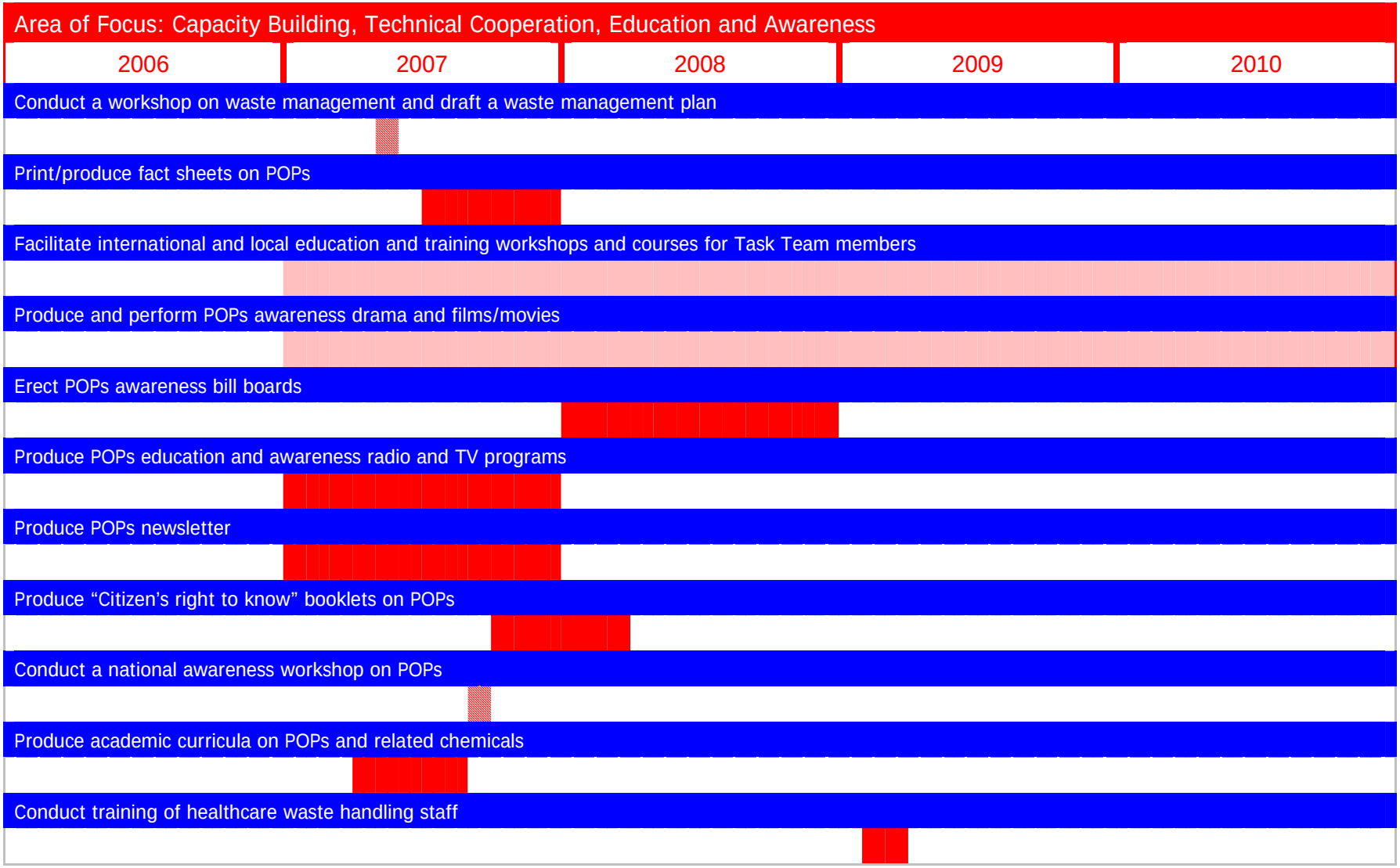
Activity	Issues addressed	Expected Output	Implementers	Cost US$	Time frame
Draw from the national budget	★ GOL should pay its fair share towards the implementation of the Stockholm Convention	★ Projects are fully supported by GOL's contributions of $150,000	EPA, MPEA, MOF		Jan 07 - Dec 10
Create public-private sector partnerships	★ Private enterprises, in particular TNCs, should help in cleaning up sectors they are involved in, e.g., pesticides in agriculture	★ Projects are co-financed by the private sector with $200,000	Firestone, MOA, LAC, CEMENCO, Rubber Planter Association	5,000	Jan 07 - Dec 10
Develop proposals to attract funding	★ Donors want to see convincing project proposals	★ Project proposals developed	EPA, Relevant Stakeholders	20,000	Jan 07 - Dec 10
Benefit from national sustainable development strategies	★ Synergies with other programs should be sought	★ National development programs fully support the project implementation	MDG,PRSP, National Development Plan, SAICM	1,000	Jan 07 - Dec 10
Cooperate through the secretariats of international conventions and donor/lender agencies	★ International networking will yield new sources	★ Financial and technical support received	UNIDO, UNITAR, GEF, UNEP, EPA, MPEA, BASEL, SAICM, IFCS	5,000	Jan 07 - Dec 10
Use bilateral and multilateral cooperation agreements	★ Existing development cooperation agreements can be extended to the POPs issue	★ High level of donor support for fast project implementation achieved	EPA MLME, MPEA, GEF, SAICM, USAID, EU	5,000	Jan 07 - Dec 10

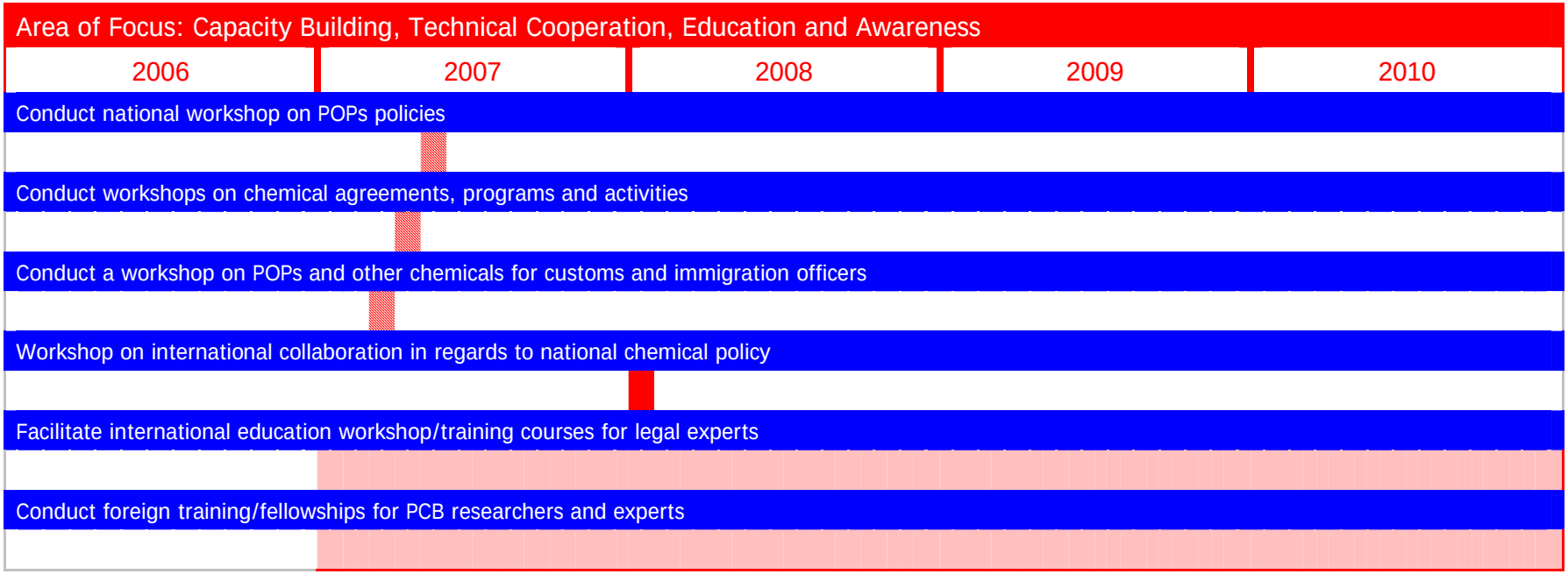

Area of Focus: Governance/Legal
2006
2007
2008
2009
2010
Develop a national program for the management of medical waste
Develop a plan for reduction of open garbage burning with provision for alternatives in areas without garbage collection
Ensure implementation of relevant international Agreements and other Protocols
Adopt the GHS
Develop regulations for export, import, transport and storage of hazardous chemicals management including pesticides and PCBs
Develop a national policy program for the sound management of POPs
Produce a Clean Air Act for Liberia

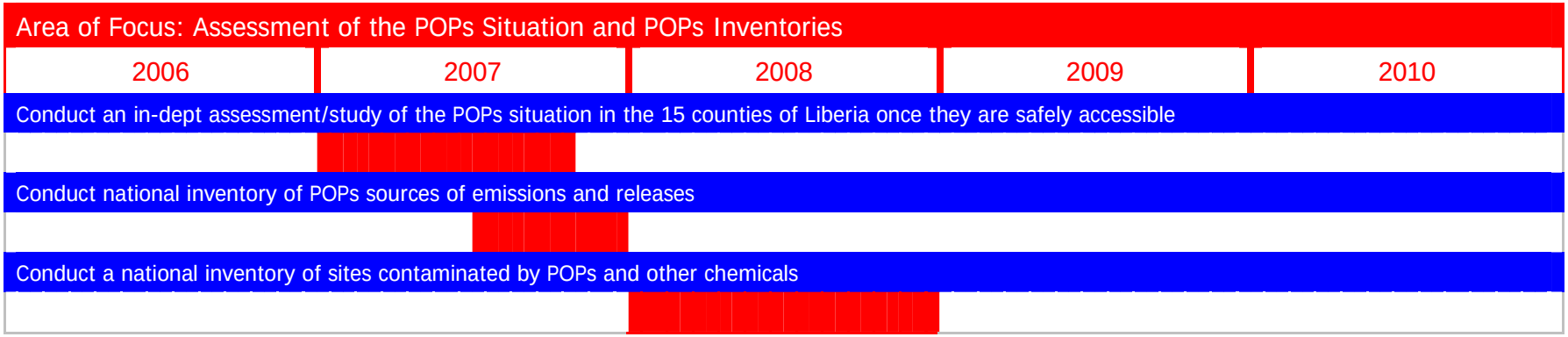

Area of Focus: Risk Reduction/Health
2006
2007
2008
2009
2010
Conduct detailed assessment of POPs and POPs related chemicals used in the country and their impact on health and the environment
Develop a database and register for chemicals, indicating their hazards

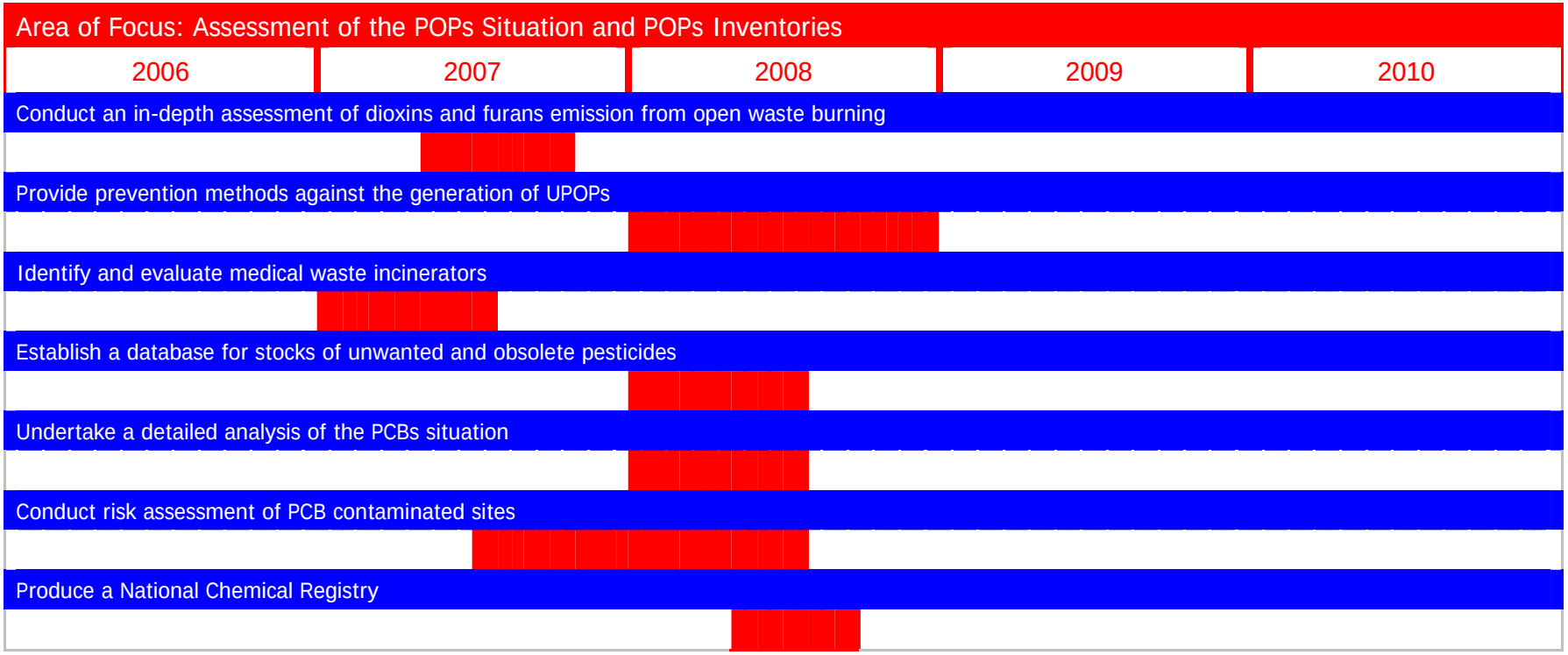

Area of Focus: Risk Reduction/Health
2006
2007
2008
2009
2010
Establish a health and environment surveillance program


Area of Focus: Capacity Building, Technical Cooperation, Education and Awareness
2006
2007
2008
2009
2010
Conduct a training workshop/seminar on hazardous chemicals and POPs contaminated sites
Conduct training for laboratory technicians
Establishment of a chemical laboratory or upgrading existing laboratories
Facilitate an international training workshop on contaminated site remediation
Establish a data base on POPs and related chemicals in Liberia
Conduct a UNEP training course on chemical websites usage and purchase the required computer equipment
Launch POPs public education program and produce training courses and materials for the public and educational institutions on POPs management
Develop plans for outreach public education and training on POPs and other chemicals

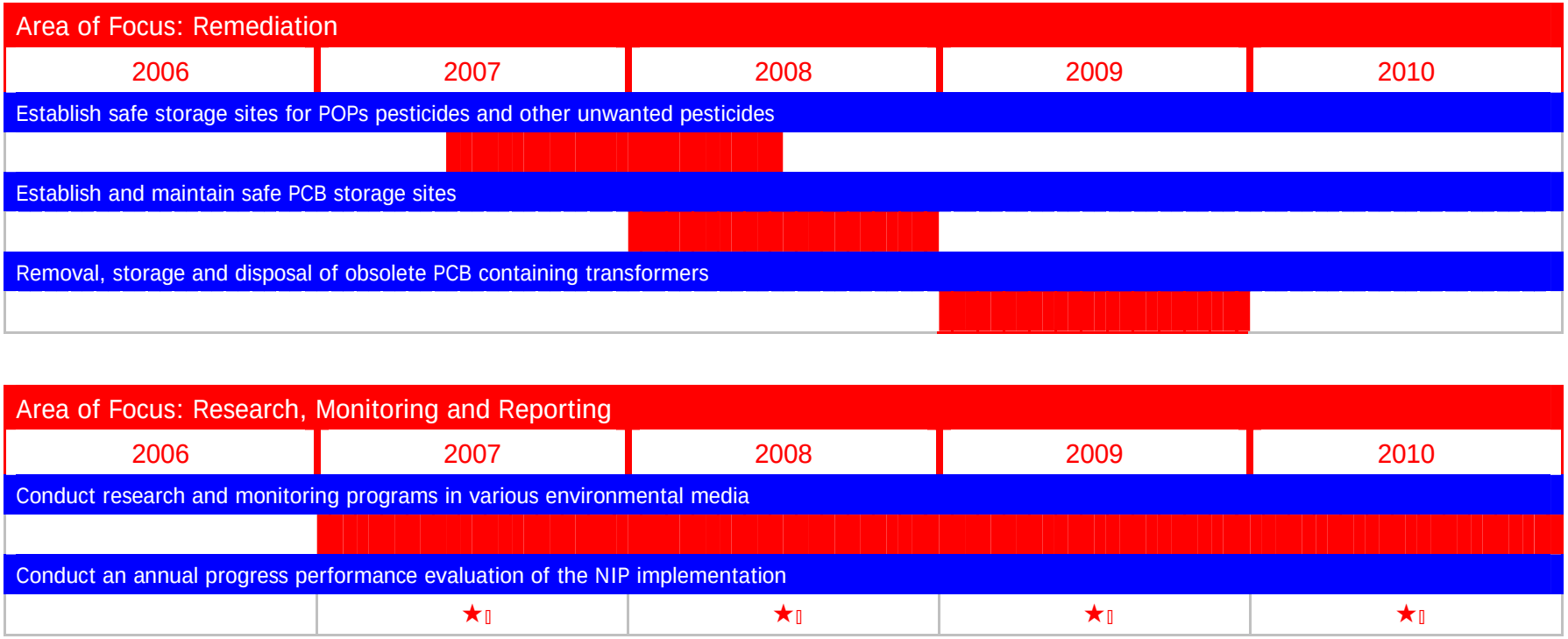

Area of Focus: Capacity Building, Technical Cooperation, Education and Awareness
2006
2007
2008
2009
2010
Conduct a workshop on waste management and draft a waste management plan
Print/produce fact sheets on POPs
Facilitate international and local education and training workshops and courses for Task Team members
Produce and perform POPs awareness drama and films/movies
Erect POPs awareness bill boards
Produce POPs education and awareness radio and TV programs
Produce POPs newsletter
Produce “Citizen’s right to know” booklets on POPs
Conduct a national awareness workshop on POPs
Produce academic curricula on POPs and related chemicals
Conduct training of healthcare waste handling staff

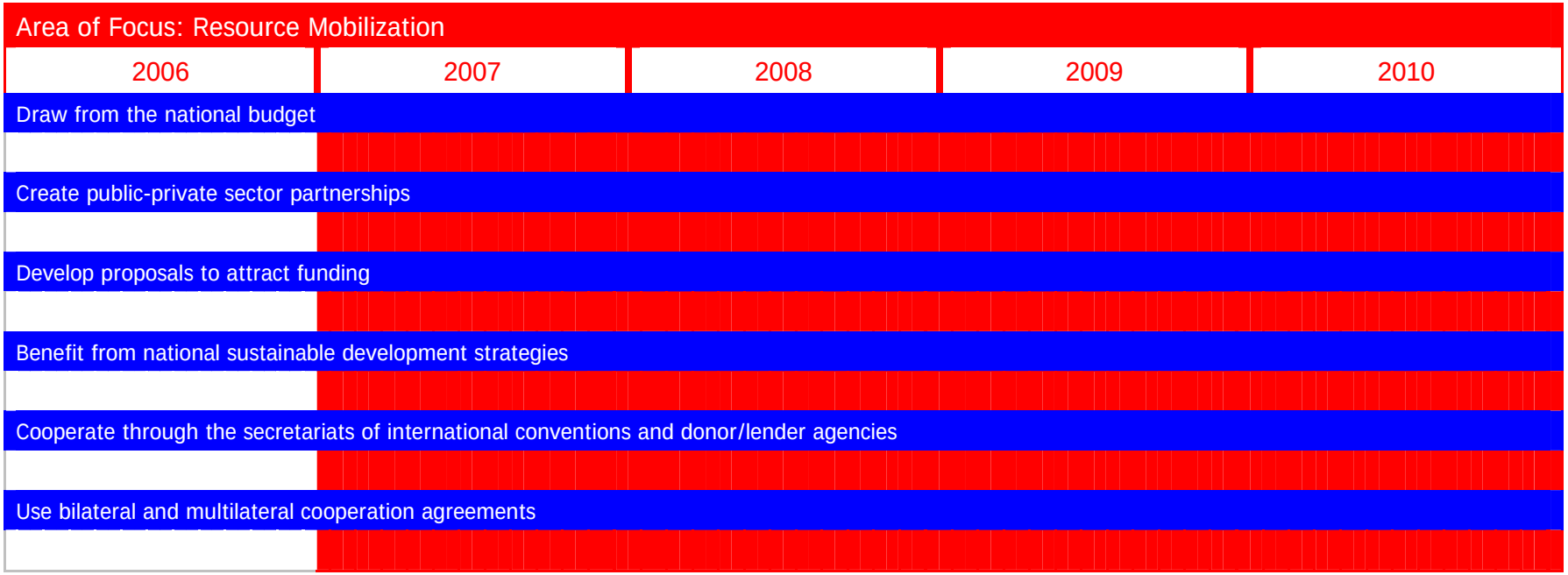

Area of Focus: Capacity Building, Technical Cooperation, Education and Awareness
2006
2007
2008
2009
2010
Conduct national workshop on POPs policies
Conduct workshops on chemical agreements, programs and activities
Conduct a workshop on POPs and other chemicals for customs and immigration officers
Workshop on international collaboration in regards to national chemical policy
Facilitate international education workshop/training courses for legal experts
Conduct foreign training/fellowships for PCB researchers and experts


Area of Focus: Assessment of the POPs Situation and POPs Inventories
2006
2007
2008
2009
2010
Conduct an in-dept assessment/study of the POPs situation in the 15 counties of Liberia once they are safely accessible
Conduct national inventory of POPs sources of emissions and releases
Conduct a national inventory of sites contaminated by POPs and other chemicals


Area of Focus: Assessment of the POPs Situation and POPs Inventories
2006
2007
2008
2009
2010
Conduct an in-depth assessment of dioxins and furans emission from open waste burning
Provide prevention methods against the generation of UPOPs
Identify and evaluate medical waste incinerators
Establish a database for stocks of unwanted and obsolete pesticides
Undertake a detailed analysis of the PCBs situation
Conduct risk assessment of PCB contaminated sites
Produce a National Chemical Registry


Area of Focus: Remediation
2006
2007
2008
2009
2010
Undertake clean-up of contaminated sites
Collection and storage of POPs contaminated equipment and containers


Area of Focus: Remediation
2006
2007
2008
2009
2010
Establish safe storage sites for POPs pesticides and other unwanted pesticides
Establish and maintain safe PCB storage sites
Removal, storage and disposal of obsolete PCB containing transformers
Area of Focus: Research, Monitoring and Reporting
2006
2007
2008
2009
2010
Conduct research and monitoring programs in various environmental media
Conduct an annual progress performance evaluation of the NIP implementation


Area of Focus: Resource Mobilization
2006
2007
2008
2009
2010
Draw from the national budget
Create public-private sector partnerships
Develop proposals to attract funding
Benefit from national sustainable development strategies
Cooperate through the secretariats of international conventions and donor/lender agencies
Use bilateral and multilateral cooperation agreements

ANNEX 7: NATIONAL INCEPTION WORKSHOP

Attendance List: May 18 – 19, 2004

No.	Name	Agency
1.	J. Karjy Sampson	National Transitional Assembly
2.	Paul Gotolo	Harbel Green Field
3.	David N. Tuah	S.D.P
4.	James N. Dogba	Health Ministry
5.	Lessa Baryogar	Pets Control, Buchanan
6.	Morris Joe	Pets Control Association, Buchanan
7.	James K. Mulbah	University of Liberia
8.	Gayflor Donis	CEEP
9.	Joseph James	CHEMICAL
10.	Francis Sando	Ministry of Justice
11.	Mark K. Hinneh, Sr.	Ministry of Justice
12.	Bibiana B. Blay	Paynesville City Corporation
13.	James s. Karbbar	Ministry of Education
14.	Chris A. Grigsby	Soniwein Community (MICAT)
15.	Jacob E. Lablah	PADS
16.	George F. Karmee	Ministry of Agriculture
17.	Arthur R. Tucker	FAO
18.	Lamuel T. Browne	Ministry of Planning
19.	Tommy N. Teah	ERADRO
20.	Neing-Ehn Kekulah	EPA
21.	John C. Jeh	EPA
22.	Isaac C. Yeah	ALEJ
23.	Matthew F. Konah	LEC
24.	Boakai A. Cooper	Ministry of Information
25.	S. Matthew P. Smith	KL & K Inc
26.	Augustus B.G. Fahnbulleh	Ministry of Agriculture
27.	Jacob Bright	Clar TV

No.	Name	Agency
28.	Jonathan Davis	EPA
29.	J.S. Datuama Cammuen	EPA-Climate Change Project
30.	Sam L. Lamah	EPA
31.	G. Ahsuerus Anderson	Dependable Enterprise, Inc
32.	Peter W. Simuyla	Don Bosco Polythenic
33.	Gregory N. Pah	Royal Industry Complex
34.	Arthur Gar-Glahn	Ministry of Transport
35.	Edwin J. Hansan	PNC Member
36.	Johnson T. B. Leaman. Sr.	Ministry of National Defense
37.	Johnny L. Lincoln	Ministry of Commerce
38.	R.A.Whitemore	POCAL
39.	Ernest G. Sharpe, Jr.	Movie Artist Production
40.	Jestina N. Ncube	Booker Washington Institute
41.	Thomas Neal	Ministry of Internal Affairs
42.	Katherine E.Y. Sawyer	MAP
43.	Henry S. Cailendee	CUC
44.	David T. Ben	AWANCO
45.	Alfred L. Brownell	Green Advocate
46.	David L. Wiles	University of Liberia(Geo Dept)
47.	John Flomo	Ministry of Finance
48.	Morris Fayah	T.T College
49.	Sam Harris	EPA
50.	Mary Woods	Green Farm
51.	Sam Johnson	Royal Paint
52.	Tom Mayson	Beer Factory
53.	Cecelia Tucker	ADRA
54.	Dickson Doe	National Port Authority
55.	Esther Teah	C.P.E
56.	Alexander Awode	L.P.R.C
57.	Tarpeh L.U. Sayee,Jr.	POCAL Actors
58.	Joseph Teah	Inland Group of Companies

No.	Name	Agency
59.	Grace Wallace	Buchanan sanitary Inspection
60.	Joe A. Lawrence	Finance Ministry
61.	Magadalane Kandu	Bible Faith Church of God Mission
62.	Amos Yaugolda	POCAL
63.	Clara Brookyln	ANACO Trading Inc.
64.	Joseph N. B. Jimmy	Ministry of Commerce
65.	Thomas A. Chesson	Suehn Dist
66.	Joseph Suah	Barnasville Farmer
67.	Joe N. Holder	Buchanan City Corporation
68.	Euguene S. Caine	Monrovia City Corporation
69.	Amos Tarr	CDE
70.	Mary Collins	LNTG
71.	Frankie Cassette	CUC
72.	Matthew G. Lloyd	AEL (Green Advocate)
73.	Fodee Kromah	EPA (Executive Director)
74.	Grace Mitoko	UNIDO
75.	Henry O. Williams	EPA
76.	Jemima D. Garneo	EPA/Secretariat
77.	Tenneh M. Saygbe	EPA/Secretariat
78.	Emmanuel J. Tarr	POCAL
79.	D.Suaffa Debbue Nirrus	Randall & Front Street
80.	Harris W. Gbahn	ICA Camp, Sinkor, 16 Street

ANNEX 8: TRAINING WORKSHOP ON POPs INVENTORIES

LIST OF PARTICIPANTS

1.	James S. Karbbar	Ministry of Education
2.	Gloria Stevens	JFK Hospital
3.	Wilfed T. Gertor	Ministry of Health
4.	Tarpeh L. U-Sayee, Jr.	POCAL Actors
5.	Morris Joe	Pest Control Buchanan
6.	Torsour Y. Jallabah	University of Liberia
7.	Tommy N. Teah	ERADRO
8.	Joseph James	CHEMCAL
9.	Prof. N. Kekulah	EPA
10.	Jonathan Davies	EPA
11.	Johnny Lincoln	Ministry of Commerce
12.	Clara Brooklyn	ANARCO Trading Ent.
13.	Boakai A. Cooper	Ministry of Information
14.	Tugbeh C. Tugbeh	University of Liberia
15.	Eunice N. Dagbe	EPA
16.	Dexter Tiah	Henries Law Firm
17.	Eugene S. Caine	Monrovia City Corporation
18.	Jacob E. Bright	Clar TV
19.	James E. Coleman	EPA
20.	Bibiana B. Blay	Ministry of Justice
21.	Madgalene Kandu	Bible Faith Church
22.	Matthew F. Konai	LEC
23.	Joseph N. B. Jimmy	Ministry of Commerce
24.	Arthur R. Tucker	FAO
25.	Lemuel T. Browne	Ministry of Planning
26.	John C. Jeh	EPA
27.	Katherine E. Y. Sawyer	MAP Actors
28.	Henry O. Williams	EPA
29.	Isaac C. Yeah	ALEJ
30.	Oscar Vanyamba	Rural Development Ministry
31.	Jemima D. Garneo	EPA
32.	Tenneh Saygbe	EPA
33.	Frances Browne	EPA
34.	Dr. Fodee Kromah	EPA
35.	David Kollie	AME University
36.	Moses Varney	EPA
37.	Otis Phens	EPA
38.	Winifred Eralube	EPA
39.	Szabolcs Fejes -	UNIDO
40.	Emmanuel J. Tarr	POCAL
41.	Peter Toby	Analyst Newspaper
42.	David Wiles	University of Liberia
43.	Amos Yargoldmer	POCAL

ANNEX 9: VALIDATION WORKSHOP

7 July 2005

List of Participants

1. A. Morris Darbney
2. Abraham Tucker
3. Alice T. Freeman
4. Amos Yargoldmer
5. Andrew K. Mayor
6. Anthony Boakai
7. Arthur Gar-Gblan
8. Arthur R. Tucker
9. Atty. Dexter Tiah, Sr.
10. Augustine Dolo
11. Ben T. Donnie
12. Bisi Klah
13. Boakai A. Cooper
14. Bob Smart
15. Braciha J. Brapoh
16. Cecelia Godwin
17. Charles A. Jasllah
18. Clara Brooklyn
19. D. Staffa Dennis Morris
20. Dr. Fodee Kroma
21. Dr. O. Vanyanbah
22. Earl R. Neblelt
23. Eben Moses
24. Emmanuel Tarr
25. Esther Gorwar
26. Frances W. Brown
27. Francis Sando
28. Gloria Stevens
29. Grace Wallau
30. Gregory N. Pah
31. Henry O. Williams
32. Henry S. Caillendee
33. Isaac Yeah
34. Jacob E. Laglah
35. James S. Karbbar
36. James S. Roberts, Sr
37. Jemima D. Garneo
38. Jesse Baryogar
39. Joan M. Gbakoyah
40. Johansen T. Voker
41. John C. Jeh
42. Johnny Lincoln
43. Johnson T. B. Leaman Sr.
44. Jonathan Davies
45. Joseph James
46. Justina N. Ncube
47. Justine Bryant
48. Karim Ibraham
49. Katherin Sawyer
50. Lemuel T. Brown
51. Madgalene Marnder
52. Magdalene Karndu
53. Matthew F. Konai
54. Morris Joe
55. Moses Y. Varney
56. Otis S. Phen
57. Peter Toby
58. Prof. Neing – Ehn Kekulah
59. Quitina B. Cooper
60. R. A. Whittemore
61. Rev. Awdoph
62. Richard W. Clarke
63. Richard Wiles
64. Ruth T. Tobey
65. S. Matthew P. Smith
66. Sampson Boymah
67. Solomon K. Wratee, Sr.
68. Tenneh M. Seygbe
69. Thomas A. Chesson
70. Tugbeh C. Tugbeh
71. Welleh Bohlen
72. Wilfrod T. Gortor
73. Winifred Eralubee
74. Z. Roosevelt Page

ANNEX 10: PUBLIC CONSULTATION MEETINGS AND WORKSHOPS

1. PNC meeting ..... 6 April 2004
2. Enabling Activities meeting ..... 9 April 2004
3. First Stakeholders meeting ..... 30 April 2004
4. Second Stakeholder meeting ..... 13 May 2004
5. PNC meeting ..... 17 May 2004
6. Inception Workshop ..... 18 – 19 May 2004
7. Task Force meeting ..... 9 July 2004
8. Regular meeting of PNC ..... 22 Sept 2004
9. PNC meeting ..... 24 Sept 2004
10. Training Workshop ..... 18 Oct 2005
11. Regular meeting of PNC ..... 14 Dec 2004
12. POPs Secretariat meeting ..... 15 Dec 2004
13. Regular Task Team meeting ..... 3 Feb 2005
14. PNC Progress Report meeting ..... 22 June 2005
15. National Priority Validation Workshop ..... 7 July 2005
16. Expert Consultation meeting ..... 10 Dec 2005
17. Expert Consultation meeting ..... 28 Feb 2006