THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS (POPs)

NATIONAL IMPLEMENTATION PLAN (NIP) FOR TRINIDAD AND TOBAGO

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"Initial Assistance to Enable Trinidad and Tobago to Fulfil its Obligations under the Stockholm Convention on Persistent Organic Pollutants"

GEF Implementing Agency

United Nations Development Programme (UNDP)

National Focal Point

Multilateral Environmental Agreements Unit (MEAU)
Ministry of the Environment and Water Resources
Level 26, Tower D, International Waterfront Centre
1A Wrightson Road, Port of Spain

EXECUTIVE SUMMARY

Introduction

Trinidad and Tobago, a twin-island state in the Caribbean with a population of 1.3 million, has an economy that is dominated by the petrochemical industry that includes the production and refining of crude oil and natural gas. Additionally, there are eleven (11) ammonia plants, seven (7) methanol plants, one (1) cement producer and two (2) iron and steel mills. There are also five (5) power plants in Trinidad and one in Tobago.

The Ministry of the Environment and Water Resources (MEWR), as the National Focal Point to the Stockholm Convention on Persistent Organic Pollutants (POPs), is fulfilling its international commitments under the Convention and as such, has developed the National Implementation Plan (NIP) for Trinidad and Tobago.

POPs are a group chemicals that have been produced both intentionally as pesticides and coolants for example, and unintentionally through various industrial activities. As the name suggests, once released into the environment POPs can remain intact, are widely distributed, bioaccumulate in the food chain and are toxic to both humans and wildlife. The Stockholm Convention is the global response and treaty that requires Parties to take measures to eliminate or reduce the release of POPs, in order to protect human health and the environment from their harmful effects.

Development of the National Implementation Plan

Trinidad and Tobago acceded to the Stockholm Convention on 13th December 2002, and is obligated to submit a NIP that sets out a structured approach for fulfilling the country's obligations under the Convention. This NIP relies on information derived from various studies coming out of a Project entitled "Initial Assistance to Enable Trinidad and Tobago to Fulfil its Obligations under the Stockholm Convention on POPs" which has been implemented by the Government of Trinidad and Tobago (GORTT) with financial assistance provided through the United Nations Development Programme – Global Environment Facility (UNDP/GEF).

The research that forms the basis of Trinidad and Tobago's NIP include (i) an Inventory of POPs, (ii) a National Profile of Chemical and Waste Management, (iii) a Socio-economic Assessment of POPs Management Options, (iv) an Action Plan to address the Sources and Loads of uPOPs and the implementation of Best Available Technology (BAT) and Best Environmental Practices (BEP), as well as (v) the development of a Public Awareness Campaign related to POPs and the Stockholm Convention.

Existing Framework

In reviewing the existing institutional, policy and regulatory framework; Trinidad and Tobago has an Environmental Policy, but as of 2013 does not have a Sustainable Development Policy. The Environmental Policy recognizes the country's obligations under the Stockholm Convention, and espouses both the Polluter Pays Principle and the Precautionary Principle. As of 2013, there is no enabling legislation for the Stockholm Convention in Trinidad and Tobago. However, POPs are presently being managed to some extent under the provisions of a number of laws including:

- The Pesticides and Toxic Chemicals Act and subsidiary legislation;
- The Environmental Management Act and its subsidiary legislation.

In addition, the import of several POPs is presently regulated by the Ministry of Trade, Industry and Investment (MTII) utilising the Negative List.

At present, the requirements of the Stockholm Convention are undertaken by the Multilateral Environmental Agreement Unit (MEAU) of the MEWR (as National Focal Point and Official Contact Point) and the Pesticides and Toxic Chemicals Inspectorate (PTCI) having primary responsibility.

Monitoring of POPs is confined by local laboratories and foreign laboratories with local agents who can test for several POPs however, none of the laboratories reported the ability to test for certain Polychlorinated biphenyls (PCBs).

Assessment of POPs Issues in Trinidad and Tobago

The following is a summary of POPs Issues in the country:

- All Annex A, Part I Pesticides have been deregistered by the PTCI.

- No country-specific monitoring data for Annex A, Part 1 Pesticides in food or human tissue has been identified.

- PCBs were used extensively in electrical equipment imported into Trinidad and Tobago before 1980. Some of these transformers and other equipment are reaching the end of their useful life, and will need to be properly disposed on decommissioning. There are waste-disposal companies in the country that can dispose of PCBs in an environmentally-responsible manner. Trinidad and Tobago has set no country-specific phase-out date for PCBs.

- Other Annex A, Part II Chemicals either were never registered by the PTCI, or have been deregistered.

- Of the Annex B Chemicals, Dichlorodiphenyltrichloroethane (DDT) was deregistered by the PTCI in 1990, and is no longer. Perfluorooctane sulfonic acid (PFOS) is presently used in Trinidad and Tobago in the form of the Mirex-S leaf cutting ant bait, under an exemption under the Stockholm Convention.

- The POPs Inventory estimated a total production of 67,168.8 g TEQ of unintentionally produced POPs (uPOPs) in Trinidad and Tobago for the base year 2011, largely from the production of Chemicals and Consumer Goods. However, this inventory notes significant information gaps.

- There appear to be no remaining stockpiles of POPs Pesticides in the country.

- No country-wide inventory of POPs-contaminated sites appears to be available.

- The landfills in Trinidad and Tobago have been identified as potential sources of POPs and uPOPs to the air and via leachate. There are no test results to verify and quantify this problem.

- There are no POPs produced in Trinidad and Tobago, and Mirex-S is the only POP being imported (as an exemption under the Stockholm Convention).

- There appear to be no routine programs to monitor releases of POPs, nor to monitor the environmental and human health effects of POPs. No country-specific studies on these effects appear to have been undertaken.

- As at 2013, there appears to be no structured system in Trinidad and Tobago for information exchange with other Parties to the Stockholm Convention.

- No initiatives of Non-Government Organizations (NGOs) specific to the Stockholm Convention or POPs were identified.

- Trinidad and Tobago presently has the capability to treat and dispose of all POPs in an environmentally-responsible manner.

- Trinidad and Tobago presently has the capability to undertake assessments and other studies described in Annexes D, E and F of the Stockholm Convention.

- Local agencies have taken part in a Regional Study to measure concentrations of POPs in the tissue of selected marine fish species.

- As of 2013, there is no formalized system for assessment and listing of new chemicals under the Stockholm Convention, nor for requesting exemptions under the Convention.

Key Actions under the NIP

The following is a summary of Key Actions recommended in this NIP, over the next five (5) years (2014 to 2018, inclusive). This indicates the timing of each action, as well as the estimated budget requirement for each.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
YEAR 1 (2014)			
1	Enact Local Enabling Legislation for the Stockholm Convention by enacting a new law or amending the Pesticides and Toxic Chemicals Act (see Section 3.3.1.1)	$10,000 MEAU of the MEWR	Law is enacted by Parliament and assented to by the President.
2	Amend the Negative List to include other POPs (see Section 3.3.1.2)	Not Quantified MTII	Cabinet approves the inclusion of other POPs, and a Legal Notice is issued.
3	Revise Customs Regulations based on the Amended Negative List (see Section 3.3.1.2)	Not Quantified Customs Division	Customs Regulations are revised.
4	Revise the Occupational Safety and Health Act (OSHA) to include uPOPs as agents causing occupational diseases (see Section 3.3.1.4)	$5,000 OSH Agency	Law is revised by Parliament and assented to by the President.
5	Enact the Beverage Containers Bill (see Section 3.3.1.4)	$20,000 Minister of the Environment and Water Resources	Law is enacted by Parliament and assented to by the President.
6	Prepare a 1-page Article on PCBs and publish in Newsletters of Industry Associations (see Section 3.3.4)	$10,000 MEAU of the MEWR	Article published in all target Newsletters.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
7	Begin extension work relative to the phasing-out of Mirex-S (see Section 3.3.5.2)	No Separate Cost Ministry of Food Production	Feedback from Farmers.
8	Design and implement a Health Screening program in at-risk communities to investigate the effects of exposure to uPOPs (see Section 3.3.7.5)	Depends on the Design of the Program Ministry of Health	Health Screening Program designed and ready for Implementation.
9	Review the present situation regarding Open Burning, and prepare Appropriate and Modern Guidelines to control Open Burning (see Section 3.3.7.6)	$45,000 MEAU of the MEWR	Review completed and Guidelines prepared.
10	Establish Database for Information Sharing with other Parties to the Convention (see Section 3.3.12.1)	No Separate Cost MEAU of the MEWR	Database available for use.
11	Institute a Campaign to make the Public aware of the NIP and the action items to be instituted (see Section 3.3.13.1)	$16,000 MEAU of the MEWR	Campaign successfully implemented and completed.
12	Develop Publicly-accessible on-line Database on Pesticides and Industrial Chemicals under the PTCI (see Section 3.3.13.2)	$8,000 PTCI	Database available for use.
13	Institute procedures to investigate chemicals to be listed or exempted under the Convention (see Section 3.3.15.1)	No Separate Cost MEAU of the MEWR	Procedure implemented.
14	Assemble data on Importation of Mirex-S, and report to the Secretariat (see Section 3.3.15.2)	No Separate Cost MEAU of the MEWR	Report submitted to the Secretariat.
15	Hire 10 additional Inspectors at the PTCI (see Section 3.4.1)	Not Quantified Pesticides and Toxic Chemicals Control Board (PTCCB) and the Ministry of Health	New Inspectors Hired
16	Conduct Training on POPs Data-Gathering and Management (see Section 3.4.2)	$44,500 MEAU of the MEWR	Updated POPs Inventory.
YEAR 2 (2015)			

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
1	Within 6 weeks of the start of Year 2, prepare a Progress Update for Year 1 (see Section 3.3.14.1)	No Separate Cost MEAU of the MEWR	Report submitted to the Permanent Secretary of the MEWR.
2	Enact the Waste Management Rules (see Section 3.3.1.3)	$5,000 Environmental Management Authority (EMA) and the MEWR	Notice of the Rule has been published in the Gazette and it is laid before Parliament.
3	Provide Staffing for a new Unit at the EMA to administer the Waste Management Rules (see Section 3.4)	$100,000 for first 3 years EMA	Staff hired and assigned.
4	Update the Water Pollution Rules to explicitly include POPs (see Section 3.3.1.4)	$5,000 EMA and the Minister of the Environment and Water Resources	Notice of the revised Rule has been published in the Gazette and it is laid before Parliament.
5	Work with the preparers of the National Solid Waste Strategic Plan to ensure that it specifically addresses the management of backyard burning of waste, alternatives to the burning of tyres and burning on the landfills (see Section 3.3.1.4)	$5,000 Ministry of the Environment and Water Resources and the Ministry of Local Government	Inclusion of the specified items in the Strategic Plan.
6	Survey of Power Companies and Large Industries relative to potential PCB Transformers and other electrical equipment (see Section 3.3.4)	$20,000 MEAU of the MEWR	Completion of the Survey, and Survey Report.
7	Update the POPs Inventory (see Section 3.3.7.1)	$85,000 MEAU of the MEWR	Updated POPs Inventory.
8	Monitoring of Air Quality at Pointe-a-Pierre for uPOPs (see Section 3.3.7.2)	$100,000 MEAU of the MEWR	Completion of the AQM Survey, and Survey Report.
9	Monitoring of Air Quality downwind of 3 Landfills in Trinidad (see Section 3.3.7.3)	$300,000 MEAU of the MEWR	Completion of the AQM Surveys, and Survey Reports.
10	Leachate Testing at 4 Landfills (see Section 3.3.7.4)	$127,000 MEAU of the MEWR	Completion of Leachate Sampling and Testing, and Report.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
11	Continue the Health Screening program in at-risk communities to investigate the effects of exposure to uPOPs (see Section 3.3.7.5)	Depends on the Design of the Program Ministry of Health	Health Screening Program Implemented.
12	Implement Awareness Programs for: • Farmers, on alternatives to open burning of agricultural residue (including composting), • Public, on alternatives to open burning of household garbage (including composting), and • Public, on steps to avoid accidental setting of bush and forest fires. (see Section 3.3.7.6)	$40,000 MEAU of the MEWR, Ministry of Food Production and the EMA	Awareness Program Implemented.
13	Develop a listing of sites that are potentially contaminated with POPs Pesticides (see Section 3.3.9)	$12,500 MEAU of the MEWR	Completion of Survey, and Listing of Sites.
14	Continue research into contamination of plants and animals (such as recent study into POPs in tissue of fish) (see Section 3.3.16.1)	Not Quantified MEAU of the MEWR and the PTCI	Research continued.
15	Develop in-country capability to test for POPs (see Section 3.3.16.3)	$238,000 Chemistry, Food and Drug Division or other.	Lab available for testing.
16	Sensitize Industries to importance of Self-Monitoring for POPs and uPOPs releases (see Section 3.3.16.3)	$15,000 MEAU of the MEWR, and the Ministry of Energy and Energy Affairs (MEEA)	Sensitization Program implemented
17	Determine most appropriate methods for Implementing BAT and BEP (see Section 3.3.17.1)	$30,000 MEAU of the MEWR, the MEEA, the PTCI, the Trinidad and Tobago Bureau of Standards (TTBS) and the EMA	Technical Assistance Program implemented.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
18	Provide Technical Assistance to Flare Operators in the Energy Industry (see Section 3.3.17.2)	$65,000 MEAU of the MEWR, and the MEEA	Technical Assistance Program implemented.
19	Place an environmentally-friendly alternative to Mirex-S on the Incentives Program of the Ministry of Food Production (see Section 3.3.17.3)	Not Quantified MEAU of the MEWR, the Ministry of Food Production and the EMA	Alternative to Mirex-S placed on the Incentive Program.
20	Design Financial Incentives to Industries for Substituting Materials or Processes to reduce releases of uPOPs (see Section 3.3.17.3)	$20,000 Ministry of Finance and MEAU of the MEWR	Financial Incentives Program Designed
21	Design Financial Incentives to Industries for implementing BAT and BEP to reduce releases of uPOPs (see Section 3.3.17.3)	$20,000 Ministry of Finance and MEAU of the MEWR	Financial Incentives Program Designed
22	Design Financial Incentives to Industries for Purchase of Equipment and implementing Operational Procedures at Flares to reduce releases of POPs and uPOPs (see Section 3.3.17.3)	$95,000 Ministry of Finance and MEAU of the MEWR	Financial Incentives Program Designed
YEAR 3 (2016)			
1	Within 6 weeks of the start of Year 3, prepare a Progress Update for Year 2 (see Section 3.3.14.1)	No Separate Cost MEAU of the MEWR	Report submitted to the Permanent Secretary of the MEWR.
2	Phase out Mirex-S (see Section 3.3.5.2)	No Separate Cost PTCCB	Mirex-S is deregistered.
3	Continue the Health Screening program in at-risk communities to investigate the effects of exposure to uPOPs (see Section 3.3.7.5)	Depends on the Design of the Program Ministry of Health	Health Screening Program Implemented.
4	Prepare Guidelines on the use of substitute or modified materials, products and processes (see Section 3.3.7.7).	$75,000 MEAU of the MEWR, the EMA and the Ministry of Food Production	Number of Stakeholders provided with information.
5	Testing at potentially PCB-contaminated sites (assumed 10 sites) (see Section 3.3.11.1)	$92,000 MEAU of the MEWR	Completion of sampling and testing, and Report.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
6	Testing at sites potentially contaminated with POPs Pesticides (assume 10 sites) (see Section 3.3.1.2)	$143,000 MEAU of the MEWR	Completion of sampling and testing, and Report.
7	Limited Public Awareness Campaign (see Section 3.3.13.1)	$53,000 MEAU of the MEWR	Limited campaign implemented.
8	Continue Promoting the use of BAT/BEP (see Section 3.3.17.1)	Not Quantified MEAU of the MEWR and the EMA	Number of Farmers and Industries provided with information.
9	Continue Technical Assistance to Flare Operators in the Energy Industry (see Section 3.3.17.2)	Not Quantified MEAU of the MEWR, and the MEEA	Technical Assistance Program on-going.
10	Implement Technical Assistance to Farmers and other Stakeholders (see Section 3.3.17.3)	Not Quantified MEAU of the MEWR, the EMA and the Ministry of Food Production	Technical Assistance Program on-going.
11	Implement Financial Incentives to Farmers and Industries for replacing Mirex-S, substituting Materials and Processes, implementing BAT & BEP and improving Flare Operations (see Section 3.3.17.4)	Not Quantified Ministry of Finance	Financial Incentives Implemented.
YEARS 4 & 5 (2017 & 2018)			
1	Within 6 weeks of the start of Year 4, and again within 6 weeks of the start of Year 5, prepare Progress Update for Years 3 and 4, respectively (see Section 3.3.14.1)	No Separate Cost MEAU of the MEWR	Report submitted to the Permanent Secretary of the MEWR.
2	Within the first 3 months of Year 4, conduct an Audit of the NIP (see Section 3.3.14.2)	$32,000 MEAU of the MEWR	Audit Completed and Report Submitted.
3	Continue the Health Screening program in at-risk communities to investigate the effects of exposure to uPOPs (see Section 3.3.7.5)	Depends on the Design of the Program Ministry of Health	Health Screening Program Implemented.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
4	Continue to promote the use of substitute or modified materials (see Section 3.3.7.5).	Not Quantified MEAU of the MEWR, the EMA and the Ministry of Food Production	Technical Assistance Program on-going
5	Remediate sites found to be PCB-contaminated (see Section 3.3.11.3)	Too early to quantify MEAU of the MEWR	Number of remediated sites.
6	Remediate sites found to be PCB-contaminated (see Section 3.3.11.3)	Too early to quantify MEAU of the MEWR	Number of remediated sites.
7	Continue to promote the use of BAT/BEP (see Section 3.3.17.1)	Not Quantified MEAU of the MEWR and the EMA	Technical Assistance Program on-going
8	Continue Technical Assistance to Flare Operators in the Energy Industry (see Section 3.3.17.2)	Not Quantified MEAU of the MEWR, and the MEEA	Technical Assistance Program on-going.
9	Continue Technical Assistance to Farmers and other Stakeholders (see Section 3.3.17.3)	Not Quantified MEAU of the MEWR, the EMA and the Ministry of Food Production	Technical Assistance Program on-going.
10	Continue Financial Incentives to Farmers and Industries for replacing Mirex-S, substituting Materials and Processes, implementing BAT & BEP and improving Flare Operations (see Section 3.3.17.4)	Not Quantified Ministry of Finance	Financial Incentives continue in place.
11	No later than 3 months after the end of Year 5, conduct an Audit of the NIP (see Section 3.3.14.2)	$32,000 MEAU of the MEWR	Audit Completed and Report Submitted.
ACTIONS THAT ARE OUTSIDE THE SCOPE OF THIS NIP			
1	Rationalization of the National Solid Waste System (see Section 3.3.8.2).	Not Quantified	Consolidated Landfill in Operation.
2	Institute a Hazardous Transport System for Trinidad and Tobago (see Section 3.3.10)	Not Quantified	System implemented.
3	MEEA's Program to Minimize Venting and Flaring in the Energy Industry	Not Quantified	Program fully implemented.

Endorsement

Participants at the Fourth National Workshop to Support the Implementation of the Stockholm Convention held on 11th September 2013, noted that POPs issues appear to be relatively well-controlled in Trinidad and Tobago, while further studies are needed to verify and quantify issues related to unintentionally produced POPs (uPOPs). Participants therefore endorsed the NIP conditionally, subject to the following:

- Actions under the NIP should be pursued only if it does not divert funding from other actions of higher national priority.

- There should be a collaborative approach that includes the Stockholm, Rotterdam and Basel Conventions.

- Actions should be prioritized and actions related to uPOPs assigned a higher priority.

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ACKNOWLEDGEMENTS

- Dr. George Sammy, POPs Project Consultant
- Dr. Khalel Mohoyodeen, POPs Project Consultant
- Ms. Melissa Felician, POPs Project Consultant
- Ms. Joannah Bharose, POPs Project Consultant
- Mr. Kishan Kumarsingh, Ministry of the Environment and Water Resources
- Ms. Nalini Sooklal, Ministry of the Environment and Water Resources
- Ms. Rosemary Lall, United Nations Development Programme
- Mr. Hans-Erich Schulz, POPs Project Manager
- Ms. Tanya Staskiewicz, POPs Project Technical Assistant
- Mr. Hasmath Ali, Pesticides and Toxic Chemicals Control Board
- Mr. Assim Dilbar, Ministry of Food Production
- Ms. Yashi Carrington, Ministry of Energy and Energy Affairs
- Ms. Dhano Sookoo, Agricultural Society of Trinidad and Tobago
- Diane Ali, Chamber of Industry and Commerce
- Ms. Nadia Nanan, Environmental Management Authority

LIST OF ACRONYMS

ACRONYM	MEANING
BCRC	Basel Convention Regional Centre
BAT	Best Available Techniques
BEP	Best Environmental Practices
CARIRI	Caribbean Industrial Research Institute
CEC	Certificate of Environmental Clearance (issued by the Environmental Management Authority)
CFDD	Chemistry Food and Drug Division of the Ministry of Health
CTO	Chief Technical Officer
DDT	Dichlorodiphenyltrichloroethane
DNRE	Department of Natural Resources and the Environment, Tobago House of Assembly
EMA	Environmental Management Authority
ESM	Environmentally Sound Management
EPP	Environmental Policy and Planning
IMA	Institute of Marine Affairs
LNG	Liquefied Natural Gas
MEAU	Multilateral Environmental Agreements Unit
MEEA	Ministry of Energy and Energy Affairs
MFP	Ministry of Food Production
MEWR	Ministry of the Environment and Water Resources
MSDS	Material Safety Data Sheets
MOU	Memorandum of Understanding
MTII	Ministry of Trade, Industry and Investment
NIP	National Implementation Plan
NGC	National Gas Company of Trinidad and Tobago
NP	National Petroleum Marketing Company of Trinidad and Tobago
OESH	Occupational and Environmental Safety and Health
PAC	Public Awareness Campaign
PCB	Polychlorinated Biphenyl
PCDD	Polychlorinated dibenzodioxins
PCDF	Polychlorinated dibenzofurans
PETROTRIN	Petroleum Company of Trinidad and Tobago
PFOS	Perfluorooctane sulfonic acid
POP	Persistent Organic Pollutant
PTCCB	Pesticides and Toxic Chemicals Control Board
PTCI	Pesticides and Toxic Chemicals Inspectorate
SEA	Socio-economic Assessment
SIDS	Small Island Developing States
TTEMAS	Trinidad and Tobago Emergency Mutual Aid Scheme
TTLABS	Trinidad and Tobago Laboratory Accreditation Service
UNDP	United Nations Development Programme
uPOPs	Unintentionally produced POPs

1 INTRODUCTION

1.1 Rationale

The Republic of Trinidad and Tobago acceded to the Stockholm Convention on Persistent Organic Pollutants (POPs) on 13th December 2002 [1]. The objective of this Convention is to protect human health and the environment from persistent organic pollutants. Obligations under the Convention [2] include:

- Eliminating or restricting the production and use of the intentionally produced POPs.
- Prohibiting and eliminating production and use or import of POPs.
- Conducting research.
- Identifying areas contaminated with POPs.
- Providing financial support and incentives for the Convention.

This National Implementation Plan (NIP) sets out a structured approach for Trinidad and Tobago to fulfil its obligations under the Stockholm Convention.

1.2 Layout of Plan

This National Implementation Plan (NIP) conforms to guidance provided by the Secretariat of the Stockholm Convention [3], and consists of three (3) chapters and one (1) appendix. The remainder of this introductory chapter discusses endorsement of the NIP, lists predecessor studies, presents a brief overview of the Stockholm Convention and a listing of POPs, and provides a statement of limitations. Chapter 2 is the Country Baseline, and includes a basic country profile, information on the legislative framework, and an assessment of the present status of POPs and unintentionally produced POPs (uPOPs) in Trinidad and Tobago. Finally, Chapter 3 provides a Policy Statement, a Strategy and Action Plans for implementing the Stockholm Convention in Trinidad and Tobago.

1.3 Endorsement

The final draft of the NIP was discussed at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013, at the Capital Plaza Hotel. The Key Stakeholders who attended the Workshop to discuss this Plan are listed in the Appendix. After presentations during the morning session, participants were divided into five (5) working groups (see Appendix) which each discussed specific actions recommended under the NIP. Each group was specifically asked to comment on whether the NIP should be proceeded with.

Participants noted that POPs issues appear to be relatively well-controlled in Trinidad and Tobago, while further studies are needed to verify and quantify issues related to uPOPs. Participants therefore endorsed the NIP conditionally, subject to the following:

- Actions under the NIP should be pursued only if it did not divert funding from other actions of higher national priority.

- There should be a collaborative approach that includes the Stockholm, Rotterdam and Basel Conventions.

- Actions should be prioritized and actions related to uPOPs assigned a higher priority.

1.4 Predecessor Studies

Country-specific information used in the development of this Plan came from the following studies commissioned by the Trinidad and Tobago Office of the United Nations Development Programme (UNDP), in order to support the implementation of the Stockholm Convention:

- An Inventory of POPs Chemicals as well as the Identification of Sources and Loads of uPOPs – *POPs Inventory Consultancy* [4].

- A National Profile on Chemical and Waste Management in Trinidad and Tobago – *National Profile Consultancy* [5].

- A Socioeconomic Assessment (SEA) of POPs Management Options – *SEA Consultancy* [6].

- An Action Plan to address the Sources and Loads of uPOPs and the implementation of Best Available Technology (BAT) and Best Environmental Practices (BEP) – *BAT/BEP Consultancy* [7].

- A Report on a POPs Public Awareness Campaign (PAC) on the Stockholm Convention and POPs for Trinidad and Tobago – *PAC Consultancy* [29].

1.5 The Stockholm Convention

The following summary of key aspects of the Stockholm Convention is an excerpt from the Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago under the Stockholm Convention [6]:

> *The Stockholm Convention emerged out of the urgent need for global action to protect human health and the environment from the harmful effects of Persistent Organic Pollutants (POPs). The Convention requires that Parties prohibit and/or take legal administrative measures to eliminate the production, use, import and export of chemicals listed in Annex A of the Convention and*

to limit the importation of chemicals listed in Annexes A and B to purposes of environmentally sound disposal or for a use-specific exemption as permitted by the Convention. It also seeks the continuing minimisation and ultimate elimination of releases of unintentionally produced POPs.

POPs are a group of highly toxic chemical substances, which having been produced either intentionally for use in agriculture and industry or as by-products of combustion and industrial processes, persist in the environment resisting photolytic, biological and chemical degradation. The deliberate production and use of POPs has in fact been banned in many countries around the world, with few exemptions. However, the unintended production of POPs continues to be an issue of concern.

It is interesting that the same properties that originally made this class of chemicals so effective, particularly their stability, make them extremely difficult to eradicate from the environment. According to the text of the Convention, "POPs possess toxic properties, resist degradation, bioaccumulate and are transported, through air, water and migratory species, across international boundaries and deposited far from their place of release, where they accumulate in terrestrial and aquatic ecosystems …"

The weight of scientific evidence suggests that some POPs have the potential to cause significant adverse effects to human health. Exposure to POPs can lead to serious health effects including certain cancers, birth defects, dysfunctional immune and reproductive systems and greater susceptibility to disease.

For some POPs, occupational and accidental high-level exposure is of concern for workers' exposure. In addition to other exposure routes, such as through direct contact with pesticide use in the agriculture sector, worker exposure to POPs during waste management is a significant source of occupational risk. Obstacles in managing workplace exposure are in part due to poor or non-existent training, lack of safety equipment, and substandard working conditions. As well, exposure is difficult to identify due to inadequacies in monitoring of the ambient environment and inconsistencies in medical monitoring, diagnosis, reporting and treatment.

The Convention addresses:

A. *Intentionally produced chemicals such as pesticides, insecticides, rodenticides and fungicides.*

B. *Intentionally produced chemicals and whose use is restricted to disease vector control, for example Dichlorodiphenyltrichloroethane (DDT) for control of malaria.*

C. *Unintentional persistent organic pollutants produced and released unintentionally as the result of human activity.*

Unintentionally produced POPs (uPOPS) include such chemicals as Polychlorinated dibenzo-p-dioxins (PCDD) and Polycholrinated dibenzofurans (PCDF), more commonly referred to as Dioxins and Furans; Hexachlorobenzenes (HCBs); and Polychlorinated biphenyls (PCBs).

The goal of the Convention in relation to unintentionally produced POPs, is to minimize production of and where feasible, ultimate elimination of the total releases of these substances derived from anthropogenic sources. In order to achieve this goal Parties to the Convention are required to promote and, where appropriate, require the use of substitute or modified materials, products and processes to prevent formation and release of uPOPs; and promote the use of best available techniques (BAT) and best environmental practices (BEP) for the management of uPOPs.

In order for the Stockholm Convention to achieve its objective in protecting human health and the environment a precautionary approach is incorporated in dealing with toxic pollutants. Thus, the Convention also defines criteria for including new chemicals based on their persistence, bioaccumulation, potential for long-range transport, and adverse effects. A POPs Review Committee regularly considers additional candidates for the POPs list. Any party can propose a new listing by stating the reasons for its concern and in turn the Review Committee will utilize the screening provisions to make recommendations to Parties in response to such submissions.

1.6 Listing of POPs

For easy reference, Table 1 lists the full range of POPs, and Table 2 provides trade names for selected POPs.

1.7 Limitations

Two (2) primary limitations were encountered in the preparation of this NIP:

i. There was a significant lack of data to describe certain aspects of the existing situation. This was addressed by recommending additional studies to fill these data gaps.

ii. The standardized format for the NIP led to instances of repetition and also affected the smooth flow of the document. Notwithstanding this, there are benefits of using a standardized format for documents of this kind.

TABLE 1. PERSISTENT ORGANIC POLLUTANTS

ORIGINAL "DIRTY DOZEN"	NEW ADDITIONS
A: Pesticides	
Aldrin	Chlordecone
Chlordane	Alpha Hexachlorocyclohexane
DDT	Beta Hexachlorocyclohexane

ORIGINAL "DIRTY DOZEN"	NEW ADDITIONS
Dieldrin	Lindane
Endrin	Pentachlorobenzene
Heptachlor	Technical Endosulfan and its isomers
Hexachlorobenzene	
Mirex	
Toxaphene	
B: Industrial Chemicals	
Polychlorinated Biphenyls (PCBs)	Hexabromobiphenyl
Hexachlorobenzene	Hexabromobiphenyl Ether and Heptabromobiphenyl Ether (commercial octabromodiphenyl ether)
	Pentachlorobenzene
	Perflorooctane Sulphonic Acid, its salts and Perflorooctane Sulfonyl Fluoride
	Tetrabromodiphenyl Ether and Pentabromodiphenyl Ether (commercial Pentabromodiphenyl Ether)
C: By-Product	
Hexachlorobenzene	Alpha Hexachlorocyclohexane
Polychlorinated dibenzo-p-dioxins (PCDD)	Beta Hexachlorocyclohexane
Polychlorinated dibenzofurans (PCDF)	Pentachlorobenzene
Polychlorinated Biphenyls (PCBs)	

TABLE 2. TYPICAL TRADE NAMES FOR SELECTED POPS

PERSISTENT ORGANIC POLLUTANT	TYPICAL TRADE NAMES
Aldrin	Aldrec, Aldrex, Aldrite, Aldrosol, Altox, Compound 118, Drinox, Octalene, Seedrin
Chlordane	Aspon, Belt, Chloriandin, Chlorkil, Chlordane, Cortilan-neu, Dowchlor, Kypchlor, Octachlor, Octaterr, Ortho-Klor, Synklor, Topichlor.
DDT	Agritan, Azotox, Bosan Supra, Chlorophenothan, Detox, Gesarol, Kopsol, Mutoxin, Pentachlorin, Rudseam, Santobane, Zeidane.
Dieldrin	Alvit, Dieldrite, Dieldrix, Illoxol, Panoram D-31, Quintox.
Endrin	Compound 269, Endrex, Hexadrin, Isodrin Epoxide, MEndrin, NEndrin.
Heptachlor	Aahepta, Agroceres, Baskalor, Drinox, Heptagranox, Heptox, Soleptax, Rhodiachlor, Veliscol 104.
Hexachlorobenzene	Amaticin, Anticarie, Bunt-cure, Bunt-no-more, Co-op hexa, Granox, No bunt, Sanocide, Smut-go, Sniecotox.
Mirex	Dechlorane, Ferriamicide, GC 1283.
Toxaphene	Alltox, Attac, Camphochlor, Huilex, Melipax, Motox, Phenatox, Strobane-T, Texadust, Toxakil, Toxyphen, Vertac 90%.
Chlordecone	GC 1189, Kepone, Merex
Technical Endosulfan and its isomers	Thiodan, Tiovel.

2 COUNTRY BASELINE

2.1 Country Profile

This chapter provides summary information on the Republic of Trinidad and Tobago, highlighting economic and industrial activities that are relevant to Persistent Organic Pollutants.

2.1.1 Geography and Population

2.1.1.1 Location

Trinidad and Tobago is an archipelagic state situated at the southern limit of the West Indies, just 11 km from the coast of Venezuela at the nearest point (see Figures 1 and 2).

FIGURE 1. TRINIDAD AND TOBAGO IN THE WEST INDIES

FIGURE 2. TRINIDAD AND TOBAGO OFF THE COAST OF VENEZUELA

2.1.1.2 Climate

The country experiences two (2) seasons per year: a dry season roughly between January and May and a wet season roughly from June to December. Winds are dominated by the Northeast Trades, and blow predominantly from the east to northeast (see Figure 3).

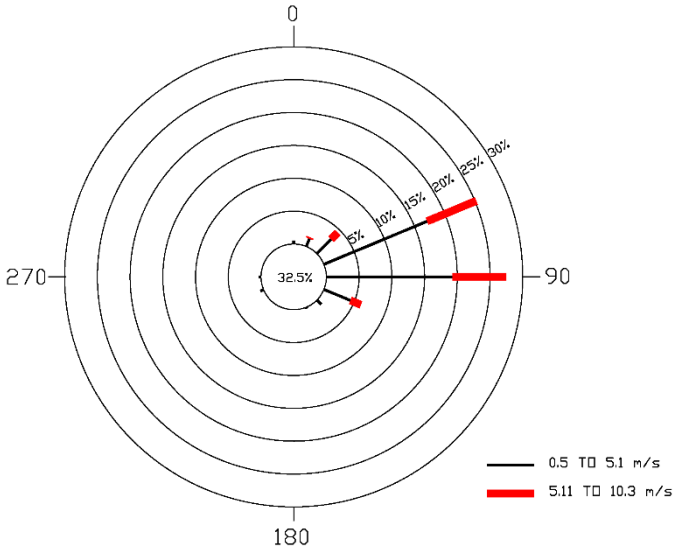

FIGURE 3. WIND ROSE OF PIARCO INTERNATIONAL AIRPORT (1995 TO 2004)

2.1.1.3 Population

The published results of the Trinidad and Tobago Census [8] indicate a total population of 1,328,019, growing at an average rate of 5.2% over the past decade. The vast majority of this population (1,267,145 persons) live in Trinidad, with 60,874 persons living in Tobago. The gender distribution is equitable (666,305 males / 661,714 females), and the dependent population (children up to 14 years old and adults older than 65 years) was 29.6% of the total population. Major centres of population are shown in Figure 4.

2.1.2 Political and Economic Profile

2.1.2.1 Political Profile

The Republic of Trinidad and Tobago is a stable democracy, with elections held on schedule at intervals not exceeding five (5) years. Transitions of power between different political parties have been achieved smoothly, with no threat of public uprising or military intervention. There have been only two (2) insurrections since independence in 1962: an army revolt in 1970 and an attempted coup in 1990.

2.1.2.2 Economic Profile

The Review of the Economy, 2012 [9], issued by the Government of Trinidad and Tobago, projects a 2012 GDP of $TT 87,811 Billion ($US 13,938 Billion). Roughly 50% of this was attributed to the Services Sector, and another 40% to the Petroleum Sector. Agriculture accounts for less than 1% of GDP. The sectors providing the largest numbers of jobs are Personal and Social Services (32%), Wholesale and Retail Trade (18.1%) and Construction (16.6%). Despite its large contribution to GDP, the Petroleum Sector accounts for only 3% of the workforce and manufacturing for only 8.6%. Over the past several years, unemployment is reported at less than 5%.

2.1.1 Profile of Economic Sectors

2.1.1.1 Petroleum Industry

The petroleum industry in Trinidad and Tobago includes production of crude oil and natural gas, both offshore and onshore, as well as refining. Offshore and onshore oil and gas fields are shown in Figure 5, and the refinery at Pointe-a-Pierre is shown in Figure 6. The Petroleum Sector produced an estimated 82,000 barrels of oil per day in 2012 [10] and 4,093 MMSCF/day of natural gas in 2011 [11].

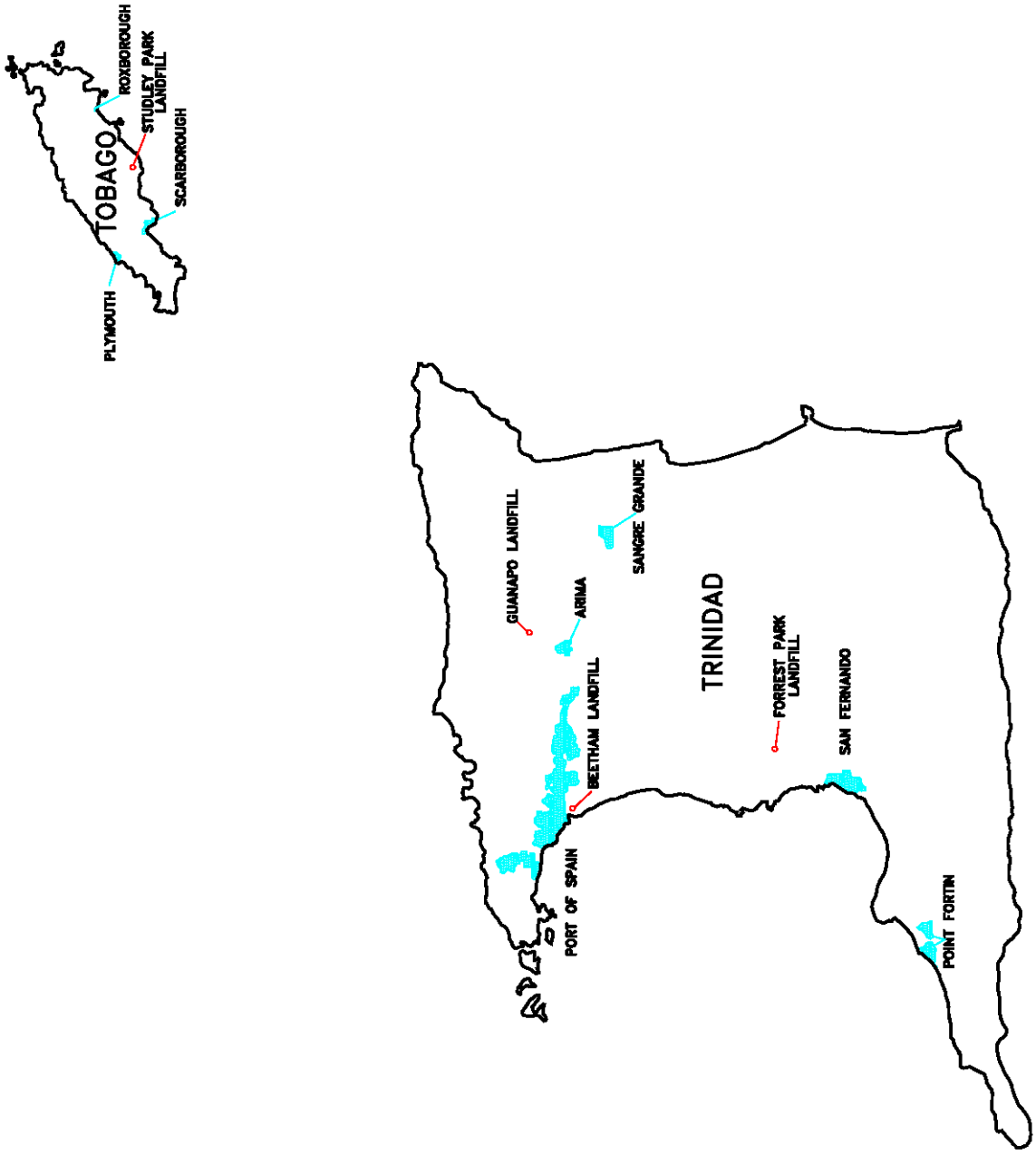

FIGURE 4. MAJOR CENTERS OF POPULATION IN TRINIDAD AND TOBAGO

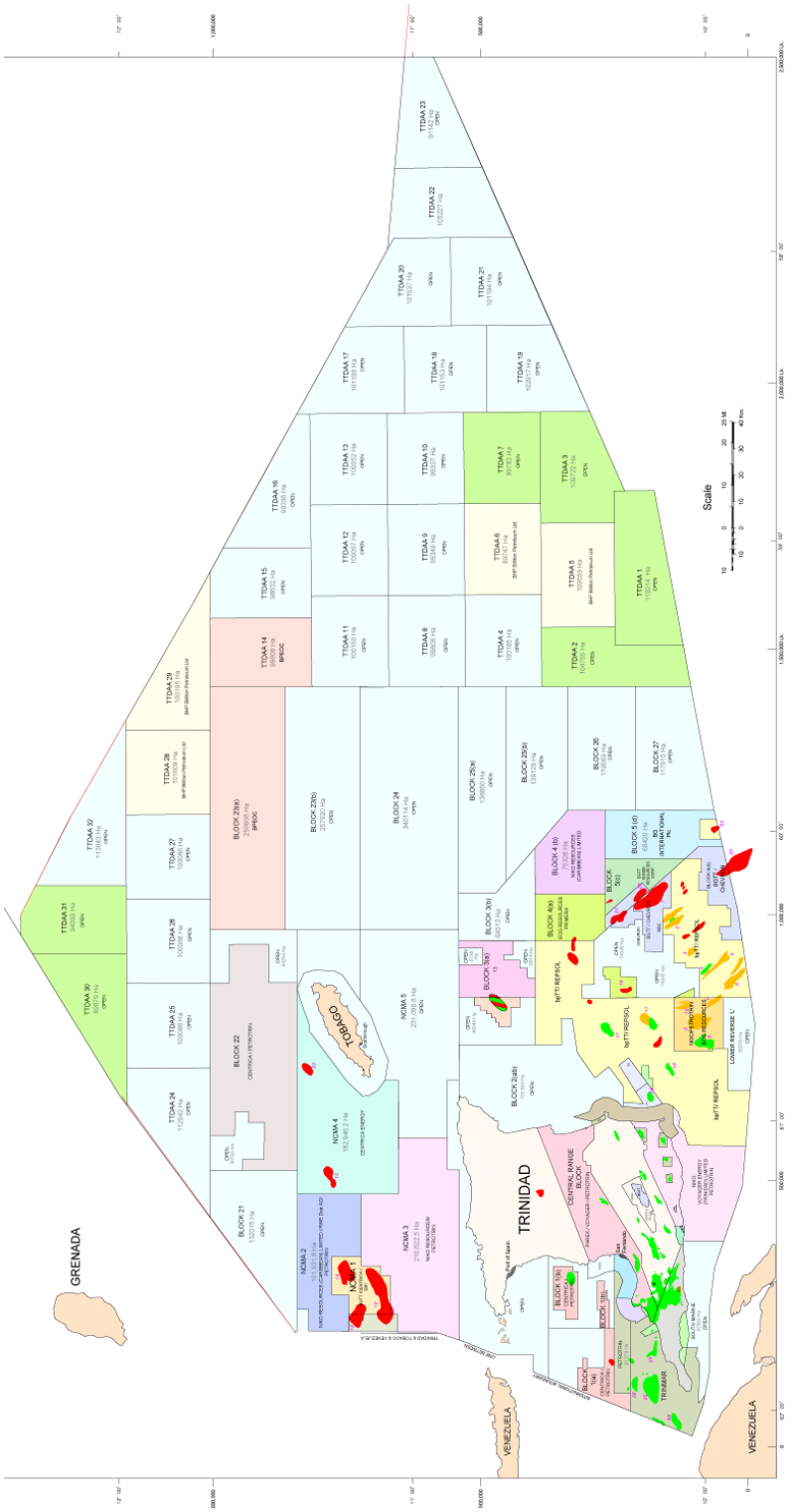

FIGURE 5. OIL AND GAS FIELDS AND OIL REFINERY IN TRINIDAD AND TOBAGO

Map prepared by Ministry of Energy and Energy Affairs, used courtesy Ministry of the Environment and Water Resources

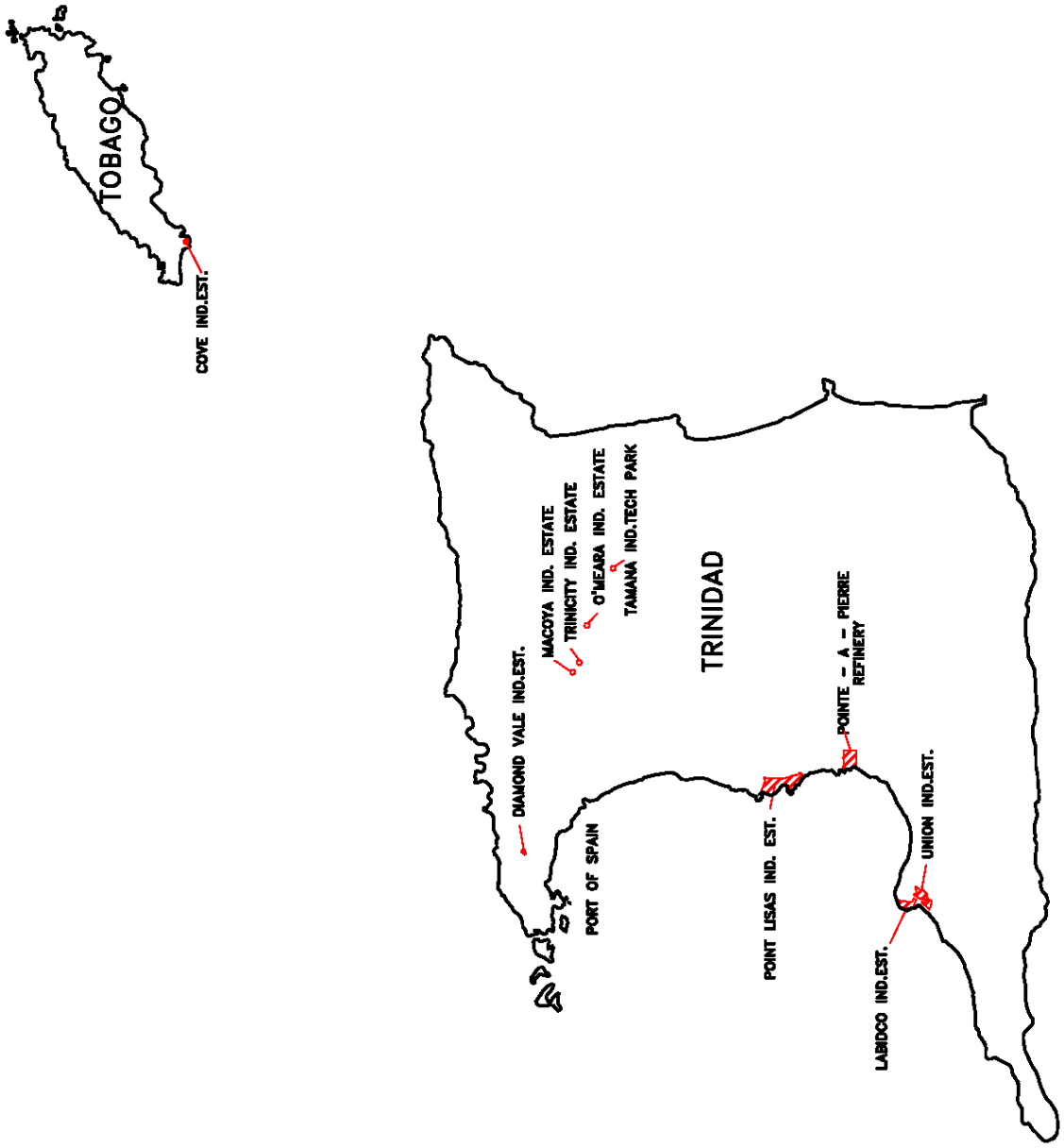

FIGURE 6. MAJOR INDUSTRIAL ESTATES IN TRINIDAD AND TOBAGO

2.1.1.2 Other Major Industries

Major industrial estates in Trinidad and Tobago are shown in Figure 6. The largest industrial sub-sectors are the following:

- Eleven (11) Ammonia Plants ranging in annual capacity from 285,000 tonnes to 650,000 tonnes; for a total annual capacity of 5.7 million tonnes [11].

- Seven (7) Methanol Plants ranging in annual capacity from 480,000 tonnes to 1.89 million tonnes; for a total annual capacity of 6.6 million tonnes [11].

- One (1) Cement Producer with an annual capacity of 780,000 tonnes [12].

- Two (2) Iron and Steel Mills, producing approximately 1.2 million tonnes per year [9].

2.1.1.3 Power Generation

Power generation in Trinidad and Tobago [11] is largely from natural gas. There are five (5) power plants in Trinidad ranging in size from 225 MW to 838 MW, with a total capacity of 2,289 MW. The single power plant in Tobago has a capacity of 68 MW, and can run on diesel as well as natural gas.

2.1.1.4 Solid Waste Disposal

Municipal solid waste is disposed primarily at the Beetham, Guanapo and Forres Park landfills in Trinidad, and at the Studley Park landfill in Tobago (see Figure 4). The first two evolved from historical dumps, while the latter two were designed. There is an on-going intermittent problem with burning garbage at Beetham and Forres Park.

2.1.2 Environmental Overview

A good environmental overview of Trinidad and Tobago is found in the National Environmental Policy, prepared by the Environmental Management Authority (EMA) [13]. Key issues raised in the Policy, most of which remain unabated, are as follows:

- Trinidad and Tobago suffers from environmental problems associated with its level of industrialisation.

- Growth in the national population has been generating a corresponding growing demand for goods and services. This demand has led to negative impacts on the physical characteristics and natural resource base of the country.

- The majority of the complaints received by the EMA relate to Noise, Air Pollution, and Littering.

- Several environmental problems have occurred as a result of inappropriate use of land, such as unplanned settlements, indiscriminate quarrying, undesirable agricultural practices and excessive logging.

- Hillside clearing for development, both planned and unplanned, has contributed significantly to slope instability, soil erosion and flooding.

- Land-based activities have also contributed to the impairment and loss of inland and coastal resources and ecosystems (wildlife, fisheries, mangroves and other wetlands, beaches, and coral reefs).

- The Gulf of Paria suffers a similar fate as a result of intensive, offshore petroleum exploitation and exploration operations on the west coast of Trinidad.

- Water courses are contaminated by pesticides and herbicides.

- The rich biological resources of Trinidad and Tobago are being overexploited, degraded and diminished, and some pest populations have increased significantly.

- Malfunctioning sewage treatment plants discharge untreated sewage into inland and coastal ecosystems.

- Changing consumption patterns of an increasing and more affluent population have resulted in the increased use of excessively packaged items and disposable containers.

- The removal of coastal wetlands has diminished nursery for fishes, water purification, flood control, and protection from storm surges and winds.

- Global environmental problems to be addressed in Trinidad and Tobago include the use of ozone depleting substances, the generation of greenhouse gases, increasing trade in biological species, and transboundary movement of wastes (including hazardous wastes).

2.2 Institutional, Policy and Regulatory Framework

2.2.1 Policies and General Legislative Framework

Long Title	Environmental policy, sustainable development policy and general legislative framework

To date, Trinidad and Tobago has not adopted a Sustainable Development Policy. Therefore, this section introduces the country's National Environmental Policy and laws that are relevant to the Stockholm Convention and POPs.

2.2.1.1 National Environmental Policy

Trinidad and Tobago has an Environmental Policy [13], but at this time does not have a Sustainable Development Policy. References to the Stockholm Convention and POPs in the Environmental Policy are as follows:

- The Section on Air Pollution indicates that the Government will "*design and implement programmes to reduce and eliminate the release of Persistent Organic Pollutants (POPs), including dioxins and furans, into the environment, followed by an eventual elimination in use*".

- The Section on Hazardous Waste indicates that "*the Government will follow the guidelines of the Stockholm Convention on Persistent Organic Pollutants".*

- The Stockholm Convention on Persistent Organic Pollutants is listed in the Annex on Treaties & Conventions on Conservation & Protection of the Environment.

The Environmental Policy also espouses two (2) key principles:

- **Polluter Pays Principle:** the cost of preventing pollution or of minimising environmental damage due to pollution will be borne by those responsible for pollution.

- **Precautionary Principle:** if there are threats of serious irreversible environmental damage, lack of full scientific certainty will not be used as a reason for postponing measures to prevent environmental degradation.

2.2.1.2 General Regulatory Framework

There is, as yet, no enabling legislation for the Stockholm Convention in Trinidad and Tobago. However, POPs are presently being managed to some extent under the provisions of a number of laws:

- The Pesticides and Toxic Chemicals Act and subsidiary legislation.
- The Environmental Management Act and subsidiary legislation.

In addition, the import of several POPs are presently regulated under the Negative List. All of these laws and regulations will be discussed in more detail in Section 2.2.4, below.

2.2.2 Roles and Responsibilities

Long Title	Roles and Responsibilities of Ministries, Agencies and other Government Institutions involved in POPs life cycles (from source to disposal, environmental fate and health monitoring)

The Institutional and Legal Framework Report [14] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago identified the following institutions as being involved in chemical and waste management in Trinidad and Tobago:

- The Multilateral Environmental Agreement Unit (MEAU) of the Ministry of the Environment and Water Resources (MEWR).
- The Ministry of Energy and Energy Affairs (MEEA).
- The Pesticides and Toxic Chemicals Board (PTCB).
- The Ministry of Food Production (MFP).
- Ministry of Trade, Industry and Investment (MTII).
- The Customs Department.
- The Environmental Management Authority (EMA).
- The Department of Natural Resources and the Environment (DNRE), Tobago House of Assembly.

Their roles are briefly described below. The final sub-section discusses the roles of two (2) agencies involved in the collection and disposal of solid waste: the Ministry of Local Government and the Solid Waste Management Company Limited (SWMCOL).

2.2.2.1 The Multilateral Environmental Agreement Unit of the Ministry of the Environment and Water Resources

The Multilateral Environmental Agreements Unit (MEAU) of the Ministry of the Environment and Water Resources (MEWR) has been appointed as the:

- National Focal Point and the Official Contact Point under the Stockholm Convention.
- Focal Point under the Basel Convention.
- Designated National Authority under the Rotterdam Convention.

The MEAU undertakes the dissemination of information concerning the Conventions, including seminars and workshops.

2.2.2.2 The Ministry of Energy and Energy Affairs

The Ministry of Energy and Energy Affairs (MEEA) regulates the use of industrial chemicals in the Petroleum and Petrochemical Sectors through its HSE Department. The MEEA has two (2) initiatives which are currently being implemented:

- The Updated National Oil Spill Contingency Plan.
- The Chemical Spill Contingency Plan which will include Chemical Management Plan.

The Subcommittee preparing the Chemical Management Plan includes major industrial players such as Atlantic LNG, The Petroleum Company of Trinidad and Tobago (PETROTRIN), The National Gas Company of Trinidad and Tobago (NGC), the National Petroleum Company of Trinidad and Tobago (NP) and also the Trinidad and Tobago Emergency Mutual Aid Scheme (TTEMAS).

2.2.2.3 The Pesticides and Toxic Chemicals Control Board

The Pesticides and Toxic Chemicals Board (PTCCB), and the associated Inspectorate (PTCI), operate under the provisions of the Pesticides and Toxic Chemicals Act (Chap. 30:03) and Regulations made under that Act. The PTCCB is responsible for registering chemicals and pesticides that can be imported into Trinidad and Tobago. Registration of a particular chemical is not permanent. Registrations can be reviewed, based on local experience or based on international information. Based on such a review, chemicals previously registered can be de-registered.

The PTCI is a technical resource to the Ministry of Trade and Industry, assisting in the decisions on the issuing of import licenses. The PTCI have indicated that they have not received any applications for the registration of any POPs, and have emphasized that any such application would be refused because their Board would not entertain it.

2.2.2.4 The Ministry of Food Production

The Ministry of Food Production (MFP) is involved in the control of the importation of pesticides through the PTCCB. The Chief Technical Officer (CTO) of the MFP is, ex officio, the Deputy Chairman of the PTCCB. In addition, the MFP has one (1) other member on the PTCCB. MFP Representatives on the PTCCB play an active role on the Screening Committee on the importation of new chemicals. POPs are banned, so the Screening Committee would not allow their importation.

The CTO of the MFP is also delegated to grant duty-free concessions for agricultural chemicals (pesticides and fertilizers). Such concessions for pesticides would be granted based on recommendations from the Crop Protection sub-Division of the Research Division, on whether the pesticides are registered by the Pesticide and Toxic Chemical Control Board, and the proposed use. Fertilizers are also recommended by the Research Division to the CTO for duty free concessions based on use of the product in agriculture.

In addition, the MFP offers incentives of up to 50% (up to a maximum of $TT 3,000) of cost for the use of environmentally friendly chemicals. A list of such chemicals has been issued by the MFP.

2.2.2.5 Ministry of Trade, Industry and Investment

The Ministry of Trade, Industry and Investment (MTII) regulates the import and export of chemicals via the Negative List and a regime of import and export licenses. In general, licenses would not be issued for items on the Negative List. This includes both the regulated substance as well as any equipment containing that substance. Import licenses issued by the MTII are used by the Customs Department for clearing cargoes, and are also examined by the Trinidad and Tobago Bureau of Standards, the Food and Drug Division, and the PTCI.

2.2.2.6 The Customs Department

The work of the Customs Department is guided by legislation, so the issue of POPs would be addressed by Customs only if regulations are put in place by a relevant Ministry. Two (2) main mechanisms are available to control the import of POPs: a licensing regime, or outright prohibition.

In either case, the necessary regulations would have to be put in place by the relevant Ministry before Customs could act on it. The Customs Department co-ordinates with other agencies concerning the importation of specific substances. For example, the MTII would issue import licenses, the PTCI would inspect certain items, and the Trinidad and Tobago Bureau of Standards and the Food and Drug Division would inspect others.

2.2.2.7 The Environmental Management Authority

The Environmental Management Authority (EMA) was created under the Environmental Management Act 2000. Under the Act, it would appear that the EMA has a general role in the management of POPs. However, the EMA does not presently have any objectives specific to POPs. As a result, the EMA does not have a department or personnel in place that were directly involved in the management of POPs. Notwithstanding, the EMA presently regulates chemicals and waste via the following mechanisms:

- Their role as Competent Authority under the Basel Convention.
- The Certificate of Environmental Clearance (CEC) Rules.
- The Water Pollution Rules.

The EMA will have a further role in the regulation of waste when the draft Waste Management Rules are enacted, and when the draft Air Pollution Rules are enacted.

2.2.2.8 Department of Natural Resources of the Tobago House of Assembly

Matters pertaining to POPs and the Stockholm Convention were normally handled by the Director of the Department of Natural Resources and the Environment (DNRE). There are no plans to develop procedures for the management of POPs specifically for Tobago. Instead, guidelines and procedures developed nationally would be used in Tobago.

Under a Memorandum of Understanding (MOU), specific roles and functions of the EMA are delegated to the DNRE. Specifically, the DNRE regulates the CEC Process (see Section 2.2.4.5, below) in Tobago. The Department also involves a large number of Agencies of the Tobago House of Assembly (THA) and other stakeholders in the Certificate of Environmental Clearance (CEC) / Environmental Impact Assessment (EIA) Process.

The DNRE is represented on the Multilateral Environmental Agreements Committee of the MEWR.

2.2.2.9 Summary of Roles and Responsibilities

TABLE 3. SUMMARY OF ROLES AND RESPONSIBILITIES OF INSTITUTIONS INVOLVED IN CHEMICAL WASTE MANAGEMENT

INSTITUTIONS	ROLES AND RESPONSIBILITIES
MEAU of the MEWR	Appointed as National Focal Point and the Official Contact Point under the Stockholm Convention, a Focal Point under the Basel Convention, and a Designated National Authority under the Rotterdam Convention.
MEEA	Regulates the use of industrial chemicals in the Petroleum and Petrochemical Sectors through its HSE Department, and has prepared draft Chemical Management Plan for the Energy Sector.
PTCB	Responsible for registering chemicals and pesticides that can be imported into Trinidad and Tobago
MTII	Regulates the import and export of chemicals via the negative list and a regime of import and export licenses.
MFP	Involved in the control of the importation of pesticides through membership in the PTCB, and also grants duty-free concessions for agricultural chemicals (pesticides and fertilizers) and incentives for the use of environmentally-friendly pesticides.
Customs Department	Co-ordinates with other agencies concerning the importation of specific substances; particularly via the Negative List.
EMA	Responsible for developing and establishing national environmental standards and criteria, and monitoring compliance with those standards and criteria.
DNRE, Tobago House of Assembly	Represented on the Multilateral Environmental Agreements Committee of the Ministry of Environment and Water Resources and also undertakes specific roles and functions of the EMA under a Memorandum of Understanding.

2.2.2.10 Management Agencies for Solid Waste

The Municipal and Regional Corporations (under the Ministry of Local Government) are involved in the collection of solid waste throughout the country, and SWMCOL operates the country's landfills (see Section 2.1.3.4). These organizations are not directly involved in the management of POPs, but they have an indirect role since the landfills have been identified as potential sources of uPOPs.

2.2.3 Relevant International Commitments and Obligations

In addition to the Stockholm Convention on Persistent Organic Pollutants, Trinidad and Tobago is signatory to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals in International Trade. These three (3) conventions together provide an international framework governing the environmentally sound management of hazardous chemicals throughout their lifecycles. The Stockholm Convention was introduced in Section 1.4, and the following introductions to the Basel and Rotterdam Conventions are excerpts from the Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago under the Stockholm Convention [6].

2.2.3.1 The Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (the Basel Convention) was adopted in 1989 in Basel, Switzerland, in response to concerns about toxic waste from industrialized countries being dumped in developing countries. The objective of the Convention is to protect human health and the environment from the harmful effects of hazardous waste. The scope covers a long list of wastes defined as "hazardous wastes" based on origin, composition and characteristics, as well as other wastes - defined here to mean household waste and incinerator ash.

The initial provisions of the Convention centred around the reduction of hazardous waste generation and the promotion of Environmentally Sound Management (ESM) of hazardous wastes. However, since its ratification, the Convention has seen several changes including the addition of the "Ban Amendment" (1995) which prohibits the export of all hazardous wastes covered by the convention, and which are intended for final disposal, reuse, recycling and recovery, to countries that are not Parties to the Convention.

Trinidad and Tobago acceded to the Basel Convention in 1994. Obligations under the Convention include inter alia:

- *The development of a National Policy to address the issues of hazardous waste and other wastes and their disposal, including national objectives to minimize the generation of hazardous waste taking into account social, technical and economic considerations.*

- *Formulation of Legislation to address the formal definition of relevant terms including "hazardous waste", "transboundary movement", and "proper disposal".*

- *Formulation of guidelines to deal with the storage, transportation and disposal of hazardous and other wastes.*

- *Submission to the Convention Secretariat on the status of actions taken.*

Trinidad and Tobago serves as the host country for the Sub-Regional Centre for Training and Technology Transfer for the Caribbean Region at Caribbean Industrial Research Institute (CARIRI). This Centre, an independent organisation since 2004, was established under a Framework Agreement signed between the Government of the Republic of Trinidad and Tobago (GORTT) and the Secretariat of the Basel Convention as well as by Act Number 2 of the Laws of the Republic of Trinidad and Tobago. The Centre currently serves fourteen (14) Parties to the Convention throughout the Caribbean region and has been active in providing training, information and technical support in aspects related to the implementation of the Basel Convention.

2.2.3.2 The Rotterdam Convention

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade was adopted in 1998. The Convention emerged out of concern for the harmful impact on human health and the environment from the trade of certain hazardous chemicals and pesticides, as reflected in the Rio Declaration on Environment and Development and Chapter 19 of Agenda 21 on "Environmentally sound management of toxic chemicals, including prevention of illegal international traffic in toxic and dangerous products".

The Convention replaced the voluntary Prior Informed Consent (PIC) standards set out by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organisation (FAO) in the International Code of Conduct and the UNEP Code of Ethics on the International Trade in Chemicals, with a mandatory PIC procedure. The objective of the Convention is to "promote shared responsibility and cooperative efforts among Parties in the international trade of hazardous chemicals in order to protect human health and the environment from potential harm and to contribute to their environmentally sound use, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties".

In this context the Rotterdam Convention is primarily about facilitating information exchange as a first line of defence against hazardous chemicals. Further, the PIC procedure enables countries to monitor and control the trade in the chemicals mentioned in the Convention; it is not a recommendation to ban the global trade or use of these chemicals. Rather, it gives importing countries the power to make informed decisions as to which of these chemicals they want to receive and those they wish to exclude due to limitations in domestic capacity to safely manage them. Additionally, obligations for proper labelling and provision of information on potential health and environmental effects related to the specific chemicals being traded provides increased opportunities for the promotion of the safe use and disposal of these chemicals.

2.2.4 Existing Legislation and Regulations

Long Title	Description of existing legislation and regulations addressing POPs, (manufactured chemicals and unintentionally produced POPs)

As noted earlier (see Section 2.2.1.2), there is currently no enabling legislation for the Stockholm Convention in Trinidad and Tobago. The Institutional and Legal Framework Report [14] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago identified the following existing laws and regulations as relevant to the management of POPs which are briefly described below:

- Pesticides and Toxic Chemicals Act and Regulations.
- The MEEA's Chemical Spill Contingency Plan which will include Chemical Management Plan.
- The Negative List.
- Incentives for Environmentally-Friendly Pesticides.
- The EMA's Certificate of Environmental Clearance Rules.
- The EMA's draft Waste Management Rules.
- The EMA's Water Pollution Rules.
- The EMA's draft Air Pollution Rules.
- The MEEA's Regulation of Flaring.
- National Solid Waste Policy and Strategic Plan.

2.2.4.1 Pesticides and Toxic Chemicals Act and Regulations

The Pesticides and Toxic Chemicals Act (Chap 30:03) defines a "controlled product" as any pesticide or toxic chemical. POPs would be classified as pesticides or toxic chemicals, so they are regulated under this law.

a) Pesticides Regulations

The Pesticides Regulations under this Act require the registration of pesticides. When an application for registration is made, the PTCCB may refuse for a number of reasons, including:

- The pesticide has not been shown to be safe or efficacious when used as recommended.
- The use of the pesticide is likely to constitute a hazard to public health, domestic animals, bees, fishes, birds or other wildlife or produce adverse effects to soil, air and water.

- The pesticide, or any residue thereof, is so persistent that it may result in a long-lasting pollution of the water or land on which it is used.

The PTCCB is required to advertise all applications for registration of a pesticide, and any person may object to the registration of a pesticide on any of the grounds listed in the Regulations. Under these clauses, any person may object to the registration of any of the POPs which are pesticides.

b) Toxic Chemicals

The Toxic Chemicals Regulations under this Act require the registration of toxic chemicals. The PTCCB may refuse to register a toxic chemical are the same as stated for pesticides in Section 3.4.1.1. Unlike the Pesticides Regulations, the Toxic Chemicals Regulations do not require advertisement of applications for registration. Instead, Clause 2 states that "every application shall be treated as confidential by the Board".

2.2.4.2 The Ministry of Energy and Energy Affairs' Draft Chemical Management Plan

The MEEA has prepared a draft Chemical Management Plan for the Energy Sector. One rationale provided for the Plan is that the PTCCB regulates individual chemicals, whereas the MEEA wishes to regulate mixtures of chemicals as used in industries in the energy sector. At the Second National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago, held on January 22 and 23, 2013, it was explained that this Plan was not intended to operate as a parallel system to the Pesticides and Toxic Chemicals Regulations, but rather to complement it by providing an additional level of oversight for chemicals used in the energy sector.

2.2.4.3 The Negative List

The Negative List is a system of import and export controls operated by the Ministry of Trade, Industry and Investment. The Import Negative List (Legal Notice No 89 / Notice to Importers No. 1 of 1999) already contains a number of POPs: DDT, Aldrin, Dieldrin, Endrin and Pentachlorophenol. The MTII has indicated that, in general, import licenses would not be issued for items on the Negative List. This includes both the regulated substance as well as any equipment containing that substance. The Negative List system has been generally acknowledged as an excellent example of effective co-ordination between Government Agencies.

2.2.4.4 Incentives for Environmentally-Friendly Pesticides

The Ministry of Food Production's Chief Technical Officer is delegated to grant duty-free concessions for agricultural chemicals (pesticides and fertilizers). Such concessions for pesticides would be granted based on recommendations from the Crop Protection sub-Division of the Research Division, on whether the pesticides are

registered by the PTCCB, and the proposed use. Fertilizers are also recommended by the Research Division to the CTO for duty free concessions based on use of the product in agriculture. The list of agrochemicals eligible for incentives includes a wide range of pesticides (insecticides, fungicides and weedicides) as well as growth regulators and plant enhancers. There are no POPs on the list.

2.2.4.5 The Environmental Management Authority's Certificate of Environmental Clearance Rules

The Certificate of Environmental Clearance is an environmental permit which sets forth conditions for the construction and operation of certain types of development. Under the CEC Rules, no developer can proceed with a development that includes one (1) or several Designated Activities. A total of 44 Designated Activities are listed in the Certificate of Environmental Clearance (Designated Activities) Order, 2001; including the establishment, expansion of a wide range of industries. It also includes waste disposal facilities. The CEC Process only applies to facilities established or expanded after 2001. For facilities not covered by the CEC Rules, the EMA can exercise control on liquid discharges via the Water Pollution Rules, but the Air Pollution Rules and the Waste Management Rules are still in draft form.

CEC Applications that include the manufacture or use of POPs are carefully reviewed, and the Ministry of Environment and Water Resources consulted. If a CEC is issued, appropriate conditions are included for the protection of the environment. The EMA does not specifically request information on POPs in the Terms of Reference (TOR) for projects and it does not appear that the CEC Rules, as presently operated, are an effective tool for assembling information on POPs and uPOPs, or for controlling their release into the environment.

2.2.4.6 The Environmental Management Authority's Draft Waste Management Rules

The draft Waste Management Rules (2008) seek to impose a duty on persons or organizations that generate, handle or dispose of any hazardous or other waste:

- To prevent the escape of any hazardous waste.

- To transfer any hazardous waste only to a person or organization who is the holder of a waste handling permit or a waste facility license.

Categories of hazardous waste are listed in the First Schedule to the draft Rules, and several categories would cover POPs.

Under the draft Rules:

- Persons or organizations who generate hazardous waste must apply for Registration as a Generator.

- Any person or organization (including a Local Authority) who proposes to carry out any activities for the storage, treatment or disposal of hazardous waste must apply for a Waste Handling Permit.

- Any person or organization (including a Local Authority) who proposes to carry out any activities for the storage, treatment or disposal of hazardous waste must apply for a Waste Facility License.

These Rules will focus on hazardous waste, and a separate Rule will be enacted for non-hazardous solid waste. The Waste Management Rules may have to be re-issued for public comment, and then must be vetted by the Chief Parliamentary Council and finally tabled in Parliament.

2.2.4.7 The Environmental Management Authority's Water Pollution Rules

The EMA's Water Pollution Rules (2001, as amended) regulate wastewater discharges from industrial facilities, commercial facilities, agricultural facilities, institutions and sewerage facilities. The First Schedule of the Rules lists a number of parameters or substances, and the concentrations at which they would be considered to be "pollutants". All facilities which discharge any "pollutant" must apply for Source Registration under the Rules. The Second Schedule of the Rules lists the permissible concentration of the same parameters or substances. Where any facility releases a water pollutant into a receiving environment outside the permissible level, that is likely to cause harm to human health or to the environment, the EMA may at any time notify that person to apply for a permit. The Water Pollution Rules does not regulate POPs, since none of the parameters or substances in the First and Second Schedules is a POP.

2.2.4.8 The Environmental Management Authority's Draft Air Pollution Rules

Various industrial, agricultural, commercial and institutional operations will come under the ambit of these rules. The First Schedule of the draft Rules sets limits for 28 parameters in ambient air, of which dioxins and furans are the only POPs. The Second Schedule sets limits for nineteen (19) parameters in stack emissions, and again dioxins and furans are the only POPs.

2.2.4.9 The Ministry of Energy and Energy Affairs' Regulation of Flaring

At present, flaring and venting in the Energy Sector is regulated by the MEEA under the Petroleum Regulations. Section 43 (h) of the regulations stipulate that:

> *"The licensee shall exert his utmost to develop any discovered fields to the maximum extent consistent with good petroleum industry practice and in particular observe sound technical and engineering principles regulating the conservation of the deposits of hydrocarbons, in*

preventing damage to adjoining petroleum bearing strata, in controlling flow, in preventing escape or waste of petroleum discovered ..."

Section 43 (s) of the regulations also require oil and gas companies to:

"Take care that gas is not liberated in such a manner as to cause pollution of the surrounding air, and to prevent all waste…"

Applying these sections of the Regulations, the MEEA seeks to ensure that flaring is kept to a practical minimum. There are mechanisms to ensure flaring and venting is minimized or eliminated. Some of these are listed below:

- Require in development plans that there are mechanisms to deal with all hydrocarbons found in reservoirs based on exploration drilling before development occurs. This is the norm currently. Unusually there are issues with low pressure gas after the field is depleted and this would then require compression facilities to be put in place.

- The gas can be harnessed by the State if the upstream company does not harness the gas. This is stated in the Petroleum Regulations and is the main reason for the genesis of the NGC - the monetization of low pressure gas streams.

- In order to monetize gas, downstream entities come into play like industries in the large and small industrial estates or for electricity generation. Another thing that can also be looked at is gas to communities.

- If there is oil production and associated gas with no immediate market, the gas can be re-injected in the well in order to improve the oil production and then re-injected again. This was done in the case of BHP Billiton.

These are some of the mechanisms that are in place to ensure gas is monetized. More specific regulations of flaring are presently being prepared by the MEEA, which would address, among other things, permissible limits on flaring or venting gas in terms of rate/duration.

2.2.4.10 National Solid Waste Policy and Strategic Plan

The Ministry of Local Government has recently issued a National Solid Waste Policy and is in the process of preparing a Strategic Plan. The primary focus of these documents will be the rationalization of solid waste management (collection and disposal) in the country. They will not focus directly on POPs or uPOPs, but the rationalized management approach is likely to reduce the potential for the generation of uPOPs at the disposal sites.

2.2.5 Key Approaches and Procedures

Long	Key approaches and procedures for the management of POPs

Title	chemicals, including enforcement and monitoring requirements

The following sub-sections describe enforcement and monitoring, industry practices and training.

2.2.5.1 Enforcement and Monitoring

Enforcement of the requirements of the Stockholm Convention will be undertaken by the Government Agencies listed in Section 2.2.2, in accordance with the Local Enabling Legislation (to be enacted) and the other laws and regulations listed in Section 2.2.4.

Legal action against violators will require laboratories to test samples and verify the presence of POPs. Trinidad and Tobago is served by several laboratories (local and foreign with local agents) that can test for some POPs [15], as listed in Table 4. None of the laboratories reported the ability to test for the following PCBs:

- Polychlorinated dibenzo-p-dioxins (PCDD).
- Polychlorinated dibenzofurans (PCDF).
- Hexabromobiphenyl.
- Hexabromobiphenyl Ether and Heptabromobiphenyl Ether (commercial octabromodiphenyl ether).
- Perflorooctane Sulphonic Acid, its salts and Perflorooctane Sulfonyl Fluoride.
- Tetrabromodiphenyl Ether and Pentabromodiphenyl Ether (commercial Pentabromodiphenyl Ether).

It is a common requirement internationally that laboratories providing evidence for legal proceedings must be accredited. There are two (2) private sector laboratories operating in Trinidad and Tobago that are accredited in their home countries. However, the Environmental Laboratory of the Chemistry, Food and Drug Division (CFDD) and the laboratories of CARIRI are not currently accredited.

TABLE 4. LOCAL CAPABILITY FOR TESTING POPS

PERSISTENT ORGANIC POLLUTANTS	Environmental Lab at the CFDD	CARIRI	Private Sector Labs
Aldrin	✓	✓	✓
Chlordane	✓		✓
DDT	✓	✓	✓
Dieldrin	✓	✓	✓
Endrin	✓	✓	✓
Heptachlor	✓	✓	✓
Hexachlorobenzene	✓		✓
Mirex	✓		✓
Toxaphene	✓		✓
PCBs	✓		✓
Chlordecone			✓
Lindane		✓	✓
Pentachlorobenzene			✓
Technical Endosulfan and its isomers			✓

PERSISTENT ORGANIC POLLUTANTS	Environmental Lab at the CFDD	CARIRI	Private Sector Labs
Alpha Hexachlorocyclohexane	✓		
Alpha Hexachlorocyclohexane	✓		

✓ *Indicates testing capability*

2.2.5.1 Industry Practices

Information on industry practices and procedures for handling, storage and use of industrial chemicals is provided in the Infrastructure Report [16] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago. For that study, manufacturing companies and utilities were invited to provide information concerning their management of industrial waste and those which responded represent a good cross-section of companies operating in Trinidad.

These may be grouped into a number of categories, the first four (4) of which include nine (9) large operations:

- Four (4) Petrochemical Industries.
- Two (2) Electricity Utilities.
- Two (2) Iron and Steel Mills.
- One (1) Integrated Petroleum Production and Refining Company.

The remaining six (6) categories include ten (10) small or medium operations:

- Two (2) Pest Control Companies.
- Two (2) Manufacturers of Iron and Steel Products.
- Two (2) Manufacturers of Concrete Products.
- Two (2) Industrial Gas Producers.
- One (1) Manufacturer of Paper Products.
- One (1) Pipeline Construction Company.

a) Health and Safety Personnel

The majority of organisations have Health and Safety (H&S) Managers supported by officers, with only one (1) reported having an H&S Officer but no Manager. For the most part, the H&S Managers reported to the head of the company (President, Chief Executive Officer or Managing Director).

b) Use of Industrial Chemicals

The majority of large companies have formal procedures for selecting new chemicals (Management of Change Systems, Hazardous Material Policies, Chemical Safety Program, etc.). Small and medium companies tend to rely on manufacturer's recommendations and recommendations from suppliers. A few companies reported using Hazcom Programs or Risk Assessments in planning for the safe handling of chemicals. The majority reported using other methods, mainly information from the of Material Safety Data (MSD) Sheets.

c) Training of Workers

Several large companies provide training in Hazardous Waste Operations and Emergency Response (HAZWOPER) and Hazardous Materials (HazMat), but the medium and smaller companies do not. Instead, some medium and small industries provide training in chemical safety and spill response. Many industries train their workers in the use of MSD Sheets.

d) Emergency Response

All industries have an in-house emergency response capability. If the emergency exceeds their in-house facilities, industries indicated that they can call on the fire service, the Trinidad and Tobago Emergency Mutual Aid Scheme (TTEMAS) or private contractors.

e) Waste Disposal

All industries use waste disposal companies to treat and dispose at least some of their waste. Some companies have indicated an in-house capability to treat oily gravels, oily waste, as well as small amounts of aluminium phosphate.

2.2.5.2 Training

Information on available training in the handling, storage and use of industrial chemicals is provided in the Infrastructure Report [16] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago. This training is available at two (2) levels: University Degrees and Short Courses.

a) University Degrees

Tertiary level institutions in Trinidad and Tobago offer training up to Bachelors and Master's Degree levels related to chemical management in the area of Occupational and Environmental Safety and Health (OESH). Some of the competency outcomes and goals of these programmes include:

- Recognition of OESH challenges.
- Evaluation of OESH challenges.
- Management and control of OESH challenges.
- Development, design, implementation and management of complex OESH programmes.
- Provision of high level leadership in research and policy-making.
- Certification in Safety Engineering in the Industrial Environment.

- Trained professionals who will inspect, audit, analyse and advise management on how to develop and maintain a safety culture.

b) Short Courses

There are several private institutions that provide many short courses and training in the following areas related to chemical and waste management:

- Accident Investigation.
- Risk Assessment.
- HASWOPER.
- Pipeline Hazardous Materials Response.
- Hazardous Transportation.
- Basic Chemical Safety,
- Transport of Hazardous Material.
- Annual certification and re-training programs for asbestos workers, supervisors and inspectors.
- HazMat Technician Training.
- Medic First Aid Training.
- OSHA Training
- Industrial Firefighting.
- Chemical Safety/MSDS/Hazcom.
- Basic Safety Training.
- Job Safety Analysis.
- Hazard Communication.
- Handling Hazardous Materials.
- Incident /Accident Reporting, Investigation & Root Cause Analysis.
- Safety Auditing Procedures & Practices.
- Emergency Response.
- Environmental Compliance.
- Environmental Awareness.
- Incident Command System.
- Industrial Fire-Fighting.
- Material Handling & Storage.

2.3 Assessment of the POPs Issue in the Country

This section provides information on the present status of POPs in Trinidad and Tobago. The results of predecessor studies [4] and [5] clearly show that POPs chemicals used in industry and agriculture are reasonably-well regulated, but that uPOPs are not as well documented and regulated.

2.3.1 Annex A, Part I Pesticides

Long Title	Assessment with respect to Annex A, Part 1 chemicals (POPs pesticides); historical, current and projected future production, use, import and export; existing policy and regulatory framework; summary

	of available monitoring data (data, food, humans) and health impacts.

Annex A, Part I, of the Stockholm Convention lists POPs Pesticides to be eliminated. None of these pesticides has ever been produced in Trinidad and Tobago, but some have been used in the past.

POPs pesticides are presently regulated by the PTCCB, under the Pesticides Regulations of the Pesticides and Toxic Chemicals Act (see Section 2.2.4.1). In addition, Aldrin, Dieldrin and Endrin are regulated under the Negative List (see Section 2.2.4.3). The POPs Inventory Report [4] summarized the status of registration and use of these chemicals in Trinidad and Tobago (based on information provided by the PTCI) as shown in Table 5.

TABLE 5. STATUS OF USE OF POPS PESTICIDES IN TRINIDAD AND TOBAGO

NAME	YEARS USED	PRESENT REGULATORY STATUS	PRESENTLY USED OR FOUND IN COUNTRY?
Aldrin	Before 1990	Deregistered in 1990	No
Chlordane	Before 1989	Deregistered in 1989	No
Dieldrin	Before 1990	Deregistered in 1990	No
Endrin	Before 1990	Deregistered in 1990	No
Heptachlor	N/A	Never registered	No
Hexachlorobenzene (HCB)	N/A	Never registered	No
Mirex	Before 1991	Deregistered in 1991	No
Toxaphene	N/A	Never registered	No
Chlordecone	N/A	Never registered	No
Alpha Hexachlorocyclohexane	N/A	Never registered	No
Beta Hexachlorocyclohexane	N/A	Never registered	No
Pentachlorobenzene	Before 2000	Deregistered in 2000	No
Lindane	Before 2010	Deregistered in 2010	No
Technical Endosulfan and its Isomers	N/A	Never registered	No

The Monitoring and Assessment Capacity Report [15] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago reported that of two (2) pest control companies that provided information, one (1) used Aldrin, Dieldrin and Lindane in the past but discontinued their use when it could no longer be imported. Their stock of these chemicals was small, so the chemicals were used up in their pest control work.
No country-specific monitoring data for POPs pesticides in food or human tissue appears to be available, nor have the human health effects of POPs pesticides been studied in Trinidad and Tobago.

2.3.2 Annex A, Part II Chemicals

Long Title	Assessment with respect to Annex A, Part II Chemicals (PCBs)

Annex A, Part II, of the Stockholm Convention lists POPs Industrial Chemicals to be eliminated. These are presently regulated by the PTCCB, under the Chemicals Regulations of the Pesticides and Toxic Chemicals Act (see Section 2.2.4.1), and use by industries in the Petroleum Sector will be regulated by the MEEA under their new Chemical Management Plan (see Section 2.2.4.2). The POPs Inventory Report [4] summarized the status of use of these chemicals in Trinidad and Tobago (based on information provided by the PTCI) as shown in Table 6.

TABLE 6. STATUS OF USE OF POPS CHEMICALS IN TRINIDAD AND TOBAGO

NAME	YEARS USED	PRESENT REGULATORY STATUS	PRESENTLY USED OR FOUND IN COUNTRY?
Hexachlorobenzene (HCB)	N/A	Never registered	No
Hexabromo Biphenyl ((HBB)	N/A	Never registered	No
Octabromodiphenyl Ether	N/A	Never registered	No
Pentachlorobenzene	Before 2000	Deregistered in 2000	No
Polychlorinated Biphenyls (PCBs)	---	---	---
Pentabromodiphenyl Ether	---	---	---

In Trinidad and Tobago, the use of PCBs has been primarily in transformers and other electrical equipment. The Monitoring and Assessment Capacity Report [15] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago reported that of nineteen (19) industries who provided information (see Section 2.2.5.2), only the two (2) power companies and one (1) steel mill reported having disposed of PCB-containing transformers in the past, some shipped abroad and others disposed locally. In addition, in May 2012, the EMA issued a Certificate of Environmental Clearance for a project which involved decommissioning a PCB Transformer [17].

There is a rule-of-thumb that transformers built after 1980 are generally non-PCB, based largely on the fact that the manufacture of PCBs was banned in the United States of America in 1979 [18]. To the extent that this is factual, PCB Transformers are all older than 33 years; and those that are still in service are approaching the end of their useful life. None of the 19 industries reported producing or using any of the other POPs.

Trinidad and Tobago has not set a country-specific date for phasing out of PCBs, so it is governed by the general phasing-out goals under the convention:

- 2025 for phasing out the use of equipment containing PCBs (e.g. transformers, capacitors or other receptacles containing liquid stocks).

- The treatment and elimination of the recovered PCBs by 2028.

2.3.3 Annex B Chemicals

Long Title	Assessment with respect to Annex B Chemicals (DDT and PFOS)

Annex B of the Stockholm Convention lists POPs to be restricted. At present, this Annex includes:

- Dichlorodiphenyltrichloroethane (DDT).
- Perflorooctane Sulphonic Acid (PFOS), its salts and Perflorooctane Sulfonyl Fluoride (PFOS-F).

These are presently regulated by the PTCCB, under the Pesticides Regulations of the Pesticides and Toxic Chemicals Act (see Section 2.2.4.1), and use by industries in the Petroleum Sector (considered unlikely) will be regulated by the MEEA under their new Chemical Management Plan (see Section 2.2.4.2). The POPs Inventory [4] (based on information provided by the PTCI) stated:

- DDT was used in Trinidad and Tobago prior to 1990. It was deregistered in that year and is no longer.

- PFOS is presently used in Trinidad and Tobago in the form of the Mirex-S leaf cutting ant bait, under an exemption under the Stockholm Convention.

The Institutional and Legal Framework Report [14] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago reported the view of the PTCI that their Act and Regulations were effective, since the legislation allows for a “cradle to grave” approach to the management of chemicals. The only reported drawback was a lack of regulations to manage operators and importers of pesticides. In spite of this, Inspectors work on the field to identify, seize and dispose of contraband products. In the experience of the PTCI, there is no significant problem with contraband pesticides entering the country, with the exception of small household items. In fact, there have been occasional informal reports of mosquito coils and mosquito mats on the shelves that are labelled as DDT-containing.

2.3.4 Unintentionally Produced POPs

Long Title	Assessment with respect to releases from unintentional production of Annex C chemicals (PCDD/PCDF, HCB and PCBs)

This section presents the estimate of uPOPs production from the POPs Inventory Report [4] and then discusses the specific problem of open burning of agricultural residue and garbage. Burning of garbage at the landfills will be discussed in Section 2.3.11.

2.3.4.1 Estimate of uPOPs Production

The POPs Inventory Report [4] prepared an estimate of 67,168.8 g TEQ per year for the production of unintentionally produced POPs in Trinidad and Tobago, for a base year 2011 (see Table 7).

The vast majority of uPOPs was associated with the production of chemicals and consumer goods, and it almost entirely was releases to the air. The POPs Inventory Report [4] also identified data gaps in the estimate. Deficiencies of major importance are associated with:

- Burning of Agricultural Residue (in fields).
- Landfill Leachate.
- Open Water Dumping.
- Sewage and Sewage Treatment.

A deficiency of medium importance is associated with Uncontrolled Domestic Waste Burning.

TABLE 7. ANNUAL RELEASES OF PCDD/PCDF (g TEQ/a) BY MAIN SOURCE CATEGORIES (2011)

Category	uPOPs Category/Class	Annual release (g TEQ/a)					
		Air	Water	Land	Product	Residue	TOTAL
1	Waste Incineration	1.1	0.0	0.0	0.0	0.0	1.1
2	Ferrous and Non-Ferrous Metal Production	0.0	0.0	0.0	0.0	0.0	0.0
3	Heat and Power Generation	0.0	0.0	0.0	0.0	0.0	0.0
4	Production of Mineral Products	0.4	0.0	0.0	0.0	0.0	0.4
5	Transportation	0.1	0.0	0.0	0.0	0.0	0.1
6	Open Burning Processes	73.9	0.0	45.1	0.0	0.0	119.1
7	Production of Chemicals and Consumer Goods	67,048.0	0.0	0.0	0.0	0.0	67,048.0
8	Miscellaneous	0.1	0.0	0.0	0.0	0.0	0.1
9	Disposal	0.0	0.0	0.0	0.0	0.0	0.0
10	Identification of Potential Hot-Spots				0.0	0.0	0.0
	1-9 TOTAL	67,123.6	0.0	45.1	0.0	0.0	**67,168.8**

2.3.4.2 Open Burning

The Report on Best Available Techniques (BAT) and Best Environmental Practices (BEP) to Minimize Releases of uPOPs [7] discusses the problem of open burning of agricultural residue and domestic garbage as follows:

> *Open burning is an environmentally unacceptable process which covers a wide range of different uncontrolled waste combustion practices and in the presence of waste material containing high levels of chlorine (such as some plastics) may cause the unintentional*

formation and release of many toxic and potentially harmful materials, including the chemicals listed in Annex C – PCDD/PCDF, HCB and PCB. These compounds may form during open burning regardless of the composition of the material being burnt.

There are many known sources of open burning in Trinidad and Tobago, including:

- *Forest fires and bush fires such as the burning of degraded forested areas, abandoned sugarcane lands and abandoned properties, etc.*

- *Burning of agricultural lands as a method of land clearance and the burning of crop residue and animal waste and by-products from processing.*

- *Burning of leaf litter and other garden wastes (crop residues, agricultural plastics and land clearance wastes).*

- *Burning of household waste (the burning of household garbage).*

- *Burning of commercial wastes (referred to as mixed consumer waste) and building materials.*

- *Fires at official and unofficial dumpsites – at landfills and informal waste disposal sites.*

The 2011/2012 POPs Inventory for Trinidad and Tobago [4] *lists the burning of landfill areas as a major source of unintentional POPs.*

Current research indicates that open burning is a more serious threat to public health and the environment than previously thought9. Apart from dioxins and furans, it can result in a wide range of other potentially harmful chemicals, including polycyclic aromatic hydrocarbons, carbon monoxide, metals and acidic gases. The remaining ash in the burn pile also contains pollutants, which can spread into the soil and water. Animals and fish ingest the pollutants and accumulate them in their tissues, while plants can absorb them through their leaf surfaces. When this contaminated food is eaten, the pollutants are passed on to humans.

Open burning of waste can also produce large amounts of smoke and particulates that can be a significant nuisance due to odour, eye irritation, visual impacts and respiratory health problems, particularly among children, the elderly, people with asthma or other respiratory diseases, and those with chronic heart or lung disease.

2.3.4.3 Flaring in the Energy Sector

The MEEA has indicated that flaring and venting are conducted in the Energy Sector in Trinidad for a number of reasons, including:

- Due to lack of pipelines or commercial arrangements for the gas, associated gas is flared as a waste.
- For burning off low-pressure gas (dependent on the volume) due to lack of compression and associated facilities installed.
- For burning off gas and/or off-specification products during unplanned events.
- For burning off gases during planned shutdowns and start-ups.
- For conducting gas exploration well tests.

The first two reasons likely account for the majority of the gas that is flared or vented in Trinidad.

2.3.5 Stockpiles, Contaminated Sites and Wastes

Long Title	Information on the state of knowledge on stockpiles, contaminated sites and wastes, identification, likely numbers, relevant regulations, guidance, remediation measures and data on releases from sites.

The POPs Inventory Report [4] reported that the PTCI conducted a survey on the identification and quantification of stockpiles of obsolete pesticides in the country during the period November 2011 to February 2012, and reported that there were no stockpiles of POPs pesticides in the country. SWMCOL [16] confirmed that stockpile of DDT that was previously identified was exported to Canada for proper disposal. There appears to have been no parallel survey on stockpiles of other POPs, nor of POPs-contaminated sites.

As noted in Section 2.3.2, the useful life of PCB-containing transformers in Trinidad and Tobago has either already expired or will shortly expire. As these transformers are taken out of service, they become a waste product for disposal. Such transformers have been exported for disposal in the past, but there is now the local capability to undertake such disposal [16].

To date, there has been no detailed national study of POPs-contaminated sites in Trinidad and Tobago. Seepersad et al [17] used a Geographic Information System (GIS) to plot potential sites based on possible POPs- and uPOPs-producing activities in the country. However, verification of actual POPs and/or uPOPs contamination was outside the scope of that study.

The POPs Inventory Report [4] and the Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] have also identified the landfills in Trinidad and Tobago (see Section 2.1.3.4) as potential releases of POPs and uPOPs to the air and via leachate. Again, though, there are no test results to verify and quantify this problem.

2.3.6 Production and Use of POPs

Long Title	Summary of future production, use and releases of POPs – requirements for exemptions.

There is no production of POPs pesticides or chemicals in Trinidad and Tobago. The POPs Inventory Report [4] reported that Mirex-S is being imported under an exemption under the Stockholm Convention. Information received from the Ministry of Food Production is that Mirex-S is not critical to the agricultural sector in Trinidad and Tobago at the present time. There are alternatives to this bait. For example, the active ingredient Fipronil has been quite effective when used locally in baits (Fipronol is not listed as a POPs pesticide [23]). As a result of the availability of viable alternatives, it appears that the importation of Mirex-S has been significantly reduced. If this trend continues, the use of Mirex-S is likely to be discontinued even without regulatory action to deregister it.

There are also some old PCB transformers that are coming to the end of their useful life (see Section 2.3.2). All other POPs Pesticides have been delisted by the PTCCB, or were never registered. Importation is therefore effectively prohibited.

2.3.7 Monitoring Programs

Long Title	Existing programmes for monitoring releases and environmental and human health impacts, including findings.

The Institutional and Legal Framework [14] and the Infrastructure Capacity [16] Reports of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago did not identify any routine programs to monitor releases of POPs, nor to monitor the environmental effects of POPs. Similarly, the Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] did not identify any routine programs to monitor the human health effects of POPs. Such monitoring programs would not be considered a priority in a country where the importation of POPs seems to be effectively controlled. However, such monitoring may be important if it can be established that there are significant releases of uPOPs.

The SEA Study [6] suggests that *"more research and monitoring/testing of waste water, gasses and leachate needs to be done. It is also possible that the companies that produce waste can use much of it again after it has been treated, usually as inputs into the production process. Attempts should therefore be made to recycle waste from the industrial sector. In other cases waste is best shipped back to its suppliers for proper disposal. More research is needed to determine the available options based on the actual contents and quantities of toxic and hazardous waste"*.

With specific reference to landfills, SWMCOL has indicated that they are in the process of developing a leachate monitoring program at all three (3) Trinidad landfills, This will test for pH, BOD, COD, faecal coliforms, cadmium, chromium, lead and mercury; but will not test for PCBs, furans, dioxins or other POPs. Similarly, the Department of Chemistry at the University of the West Indies has embarked on a project to monitor air, water and soil contamination at the Guanapo Landfill. This will test for oil & grease and Total Petroleum Hydrocarbons (TPH) as group parameters, as well as Polycyclic Aromatic Hydrocarbons (PAHs) and a variety of Volatile Organic Compounds (VOCs) as individual parameters. Again, though, it will not include testing for POPs and uPOPs.

2.3.8 Information, Awareness and Education

Long Title	Current levels of information, awareness and education among target groups; existing systems to communicate such information to the various groups; mechanisms for information exchange with other parties to the Convention.

Information in this section relates to five (5) different stakeholder groups:

- Industries.
- Farmers.
- Waste Disposal Companies.
- Laboratories.
- The General Public.

It also comments on exchange of information with other parties to the Convention.

2.3.8.1 Industries

The National Profile on Chemical and Waste Management in Trinidad and Tobago [5] reported that the following are the key regulatory agencies for industries in Trinidad and Tobago:

- Occupational Safety and Health Agency.
- Environmental Management Authority.
- Ministry of Energy and Energy Affairs.
- Pesticides and Toxic Chemicals Inspectorate.

Ten (10) of the nineteen (19) companies that responded to the questionnaire rated the flow of general information from the regulatory agencies as “good” or “excellent”.

Thirteen (13) of the nineteen (19) companies were aware that the MEAU of the MEWR are the agency responsible for implementing the Stockholm Convention in Trinidad and Tobago. Only one (1) company reported having asked for information on POPs, and that industry found the information provided to be limited.

Training in chemical safety available to industries was described in Section 2.2.5.3.

2.3.8.2 Farmers

The Ministry of Food Production has Extension Services that disseminate information on Pesticides to Farmers. However, Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] notes that *"there is currently a county officer put in place by the Ministry of Agriculture for each region who usually deals with problems like flooding more often than problems directly related to crop production. The National Food Crop Farmers Association suggested that an agronomist should be put in place alongside each county officer employed, so that they can work together with greater efficiency to ensure that farmers are using pesticides in the manner intended and that pesticides containing POPs are not used even if they appear at first blush to be the cheaper alternative"*.

2.3.8.3 Waste Disposal Companies

The Infrastructure Report [16] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago reported that four (4) of the six (6) waste disposal companies that responded to the questionnaire listed the Environmental Management Authority as their key regulatory agency. One (1) company rated the flow of information from government agencies (generally) as good, but two (2) rated it as variable (the other three did not provide a rating). Five (5) of the six (6) waste disposal companies were aware that the MEAU of the MEWR are the agency responsible for implementing the Stockholm Convention in Trinidad and Tobago. Two (2) waste disposal companies reported having asked for information on POPs; one (1) reported the flow of information to be good, but the other felt it was poor.

2.3.8.4 Laboratories

The Monitoring and Assessment Capacity Report [15] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago received responses from eight (8) laboratories, seven (7) locally based and one (1) international laboratory with a local agent. Most of the laboratories were aware that the MEAU of the MEWR are the agency responsible for implementing the Stockholm Convention in Trinidad and Tobago. None have requested information on POPs, so they were not in a position to comment on the effectiveness of the flow of information.

2.3.8.5 General Public

Specific information on public awareness of POPs is not available, but there is anecdotal information of environmental activists raising questions about dioxins (in particular) at public meetings. This suggests some level of awareness in that

particular segment of the public. In contrast, there is little evidence of awareness of POPs issues among other segments of the general public.

The biggest challenge associated with a public information campaign on industrial chemicals would be to present technical information in a format that will be understood by the general public; and only the PTCI, the MFP and the MEWR appear to have attempted to do this [16]. Simply put, oversimplification of technical information can result in it being misunderstood. Indeed, one group at the Second National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago, held on January 22 and 23, 2013 felt that information on dangerous chemicals may cause undue paranoia, and having this information in the public domain may facilitate acts of terrorism. They also noted that such a campaign is likely to be costly, and that there may be legal ramifications to making this information available to the public.

Notwithstanding the comments above, the PTCI has assembled a number of publications on pesticides and industrial chemicals generally, which they make available to the public as photocopies on an as-requested basis. The Information Technology (IT) staff at the PTCI has begun to upload this information onto a database.

The Consumer Affairs Division of the Ministry of Legal Affairs provided the following information concerning public information campaigns [16]:

- In Trinidad & Tobago, the spoken word is more effective than any other form of outreach to the public. In this society, printed advertisements are not read unless there is sparse wording accompanied by large, prominently placed pictures.

- Notwithstanding, any public awareness campaign with a high technical content would probably involve the print media.

- An effective campaign requires repetition, because individuals do not absorb the information the first time they see the presentation. Sometimes as many as 30 repeats are needed. For this reason, campaigns sometimes run for several months.

- Challenges may be faced in effectively packaging a radio advertisement with high technical content, since radio advertisements need to be short (between 20 to 30 seconds) in order to be most effective.

To communicate information on hazardous chemicals and waste, the Consumer Affairs Division suggested that the best route would be an audio-visual campaign, involving short bursts of information as well as effective use of high impact pictures geared towards leaving a lasting impression. They further suggested a minimum campaign period of three (3) to six (6) months for effectiveness. Ideally, there should be a higher-intensity campaign for this period, followed by a lower-intensity campaign thereafter.

2.3.8.6 Information Exchange with Other Parties

There appears to be no structured system of information exchange with other Parties to the Stockholm Convention in Trinidad and Tobago at present. Such exchange, if it does take place, is done on an informal basis.

2.3.9 Relevant Activities of Non-Governmental Organisations

Neither the Report on Socio-Economic Considerations related to the Management of POPs [6] nor the National Profile on Chemical and Waste Management in Trinidad and Tobago [5] reported any specific initiatives of Non-Governmental Organizations (NGOs) related specifically to the Stockholm Convention or POPs.

2.3.10 Overview of Technical Infrastructure

Long Title	Overview of technical infrastructure for POPs assessment, measurement, analysis, alternatives and prevention measures, management research and development – linkage to international programmes and projects.

Information on procedures adopted by industries to manage chemical safety and on laboratory testing capability were provided in Sections 2.2.5.2 and 2.2.5.1, respectively.

This section presents information on:

- Waste Disposal Capability.
- Assessment Capability.
- Linkages to International Programs.

There does not appear to be any Research and Development related to the replacement and phasing out of POPs in Trinidad and Tobago at present.

2.3.10.1 Waste Disposal Capacity

Specific information was provided by six (6) waste disposal companies, and more general information on three (3) others was accessed from an earlier report [16]. The results indicate that Trinidad is well-equipped for treatment and disposal of a wide range of industrial wastes, including:

- Oilfield Liquid Waste (hydrocarbon contaminated).
- Used Motor Oils.
- Hydrocarbon Contaminated Soil.
- Chemical Waste.
- E-waste.
- Asbestos Waste.
- Fluorescent Light bulbs.
- Plastics.

- Paper.

Treatment and disposal technologies used by these companies include:

- Incineration.
- Thermal Adsorption.
- Electro-Coagulation.
- Bioremediation.
- Enzyme Treatment.
- Fixing with Cement (fluorescent bulbs).
- Encapsulation (asbestos waste).

With particular regard to POPs, one (1) company indicated that they have the capability to treat and dispose of all 22 POPs, another indicated that they are in process of modifying their incinerator to develop the capability to treat all 22 POPs, while a third company indicated that they can treat and dispose of 11 POPs. It is unclear whether the competencies of these companies conform to international guidelines and standards, therefore an independent study to verify their capabilities is recommended. SWMCOL has no local capability to treat and dispose of POPs, however some years ago they were involved in the export of DDT for treatment.

Two (2) other companies operate incinerators, but it is not clear whether these are rated for the destruction of POPs. The technical capability of each of these facilities to treat and dispose of POPs will be verified when each company applies for a Waste Handling Permit under the Waste Management Rules (see Section 2.2.4.6).

2.3.10.2 Assessment Capability

Two (2) Government Agencies, several consulting companies and several University departments were asked to describe their capability to undertake assessments and other studies described in Annexes D, E and F of the Stockholm Convention, and eight (8) indicated such capability either totally in-house, or in partnership with international experts. These agencies and companies are also capable of providing information on alternatives, on prevention measures and on the management of POPs.

2.3.10.3 Linkages to International Programs

Both the Institute of Marine Affairs (IMA) [18] and the Chemistry Department of the University of the West Indies reported taking part in a Regional Study to measure concentrations of POPs in the tissue of selected marine fish species.

2.3.11 Impacted Populations and Environments

Long Title	Identification of impacted populations or environments, estimates scale and magnitude of threats to public health and environmental quality and social implications for workers and local communities.

The adverse human health and environmental effects of POPs and uPOPs are well-documented in the international literature. The Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] listed human health and environmental effects of selected POPs based on international sources, and these are summarized Table 8. In contrast, as stated in Section 2.3.7, no country-specific studies of the effects of POPs in Trinidad and Tobago appear to be available.

TABLE 8. HUMAN HEALTH AND ENVIRONMENTAL EFFECTS

POP	HUMAN HEALTH EFFECTS	ENVIRONMENTAL EFFECTS
Aldrin	• Toxic to Humans. • Headache, dizziness, nausea, general malaise, and vomiting, followed by muscle twitching, myoclonic jerks, and convulsions	Death in waterfowl, shorebirds, fish and humans.
Chlordane	• Possible human carcinogen. • Known to affect the human immune system. • Blurred vision, confusion, ataxia, delirium, cough, abdominal pain, nausea, vomiting, diarrhoea, irritability, tremor, convulsions and anuria.	Lethal effects of chlordane on fish and birds vary according to the species, but tests have shown that it can kill mallard ducks, bobwhite quail, and pink shrimp
Dieldrin	• Toxic to humans. • Suspected of negatively affecting immune response. • Other effects same as for aldrin.	Highly toxic to fish and other aquatic animals, particularly frogs, whose embryos can develop spinal deformities after exposure to low levels.
Endrin	• Toxic to humans. • More severe poisoning results in violent epileptiform convulsions followed by semi consciousness or coma. • Dizziness, weakness of the legs, abdominal discomfort and nausea but usually not vomiting.	Highly toxic to fish.
Heptachlor	Possible human carcinogen	Toxic to wildlife even at low concentrations.
Mirex	Possible human carcinogen.	Toxic to plants, aquatic organisms (crustaceans), fish and birds.
Toxaphene	Possible human carcinogen.	Highly toxic to fish and can cause reproductive disorders in birds.
DDT	• Serious concerns for infant health. • Chronic health effects from long term exposure. • Appears to depress humoral immune responses.	Known to cause eggshell thinning among birds.
Dioxins	• Potent carcinogens. • Cause peripheral neuropathies, fatigue,	

POP	HUMAN HEALTH EFFECTS	ENVIRONMENTAL EFFECTS
	depression, hepatitis and enlarged liver. • Linked to diabetes, hypertension and cancers.	
Hexachloro-benzene	• Toxic to humans • Possible human carcinogen. • Linked to spontaneous abortions. • Can cause dermatological lesions, hyperpigmentation, hypertrichosis, enlarged liver, enlargement of the thyroid gland and lymph nodes, and osteoporosis or arthritis, primarily in children.	A variety of adverse effects in aquatic animals, fish, birds and small mammals, such as fatigue and skin irritation, reproductive disorders, kidney and liver damage, cancer and death.

People can be affected by POPs and uPOPs via a number of pathways:

- Ingestion (eating contaminated food or drinking contaminated water).

- Inhalation (breathing contaminated air in the environment, on farms or in the workplace).

- Dermal Contact (working with POPs chemicals in workplaces or on farms, working contaminated soil, irrigation with contaminated water or bathing in contaminated water.

The Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] comments that *there is insufficient data available to properly estimate the current magnitude of the health and environmental effects of POPs, or more broadly, Persistent Toxic Substances and hazardous waste (as governed together under the Basel, Rotterdam and Stockholm Conventions) in Trinidad and Tobago. … However, some communities may be regarded as "hotspots" due to their proximity to the dumps sites or to industrial estates which house production plants for industries of specific types. It is even more difficult to estimate at this point the environmental effects of POPs in Trinidad and Tobago, since there has been little, if any, sampling and reporting that would provide baseline data for such an activity. …*

Further, it is understood that the independent treatment of POPs, as separate from other toxic chemicals including pesticides and hazardous waste, is not only cumbersome but also an inefficient use of resources. This is for two reasons - first, it is difficult to attribute causes of human illness or environmental effects to any one POP or chemical exposure; secondly, these substances coexist, and are transported similarly and all have adverse human and environmental effects and need to be properly managed from cradle to grave. Thus the SEA should ideally treat with POPs in the context of the harmonious implementation of activities that govern all chemicals under the Basel, Rotterdam and Stockholm Conventions.

Notwithstanding, the SEA Report discusses the effects of open burning in all the dumps in Trinidad as a potential health threat to the garbage picker as well as neighbouring residents. She identifies the situation at Beetham as possibly typical,

and notes that "*a study was recently conducted on the health effects of exposure to the smoke that is known to cover the area (the specific content of the gasses have not been examined) looking at the impact on lung function of the residents of the Beetham Gardens. This study concluded that residents were at risk of increased lung function and respiratory diseases*".

2.3.12 Assessment and Listing of New Chemicals

Long Title	Details of any relevant system for the assessment and listing of new chemicals.

At present, there are no formalized systems for assessment and listing of new chemicals under the Stockholm Convention. However, the PTCI has indicated its capability to undertake assessment studies toward listing of new chemicals.

2.3.13 Chemicals already in the Market

Long Title	Details of any relevant system for the assessment and regulation of chemicals already in the market.

At present, there appear to be no POPs chemicals presently on the market (excepting PCB transformers that are now in use but will eventually be retired). However, as noted in Section 2.3.2, the PTCI's registration system allows them to deregister chemicals that are deemed unsuitable for continued use. The Chemical Management Plan of the MEEA will also allow them to deregister chemicals that are presently in use in the energy sector, and are deemed unsuitable for continued use.

3 STRATEGY AND ACTION PLAN ELEMENTS

3.1 Recommended Policy Statement

The following is a **recommended Policy Statement** on POPs and the Stockholm Convention.

The Government of Trinidad and Tobago acceded to the Stockholm Convention in 2002 and is committed to adopting a precautionary approach to protect human health and the environment from Persistent Organic Pollutants (POPs). The National Policy on POPs integrates strategies for addressing POPs and sustainable development and harmonises with the National Environmental Policy and other relevant existing policies.

The Government of Trinidad and Tobago has conducted research and consultation to inform the development and implementation of a National Implementation Plan (NIP) which will be reviewed and updated periodically to ensure that it remains effective. The NIP will seek to:

- Eliminate and prohibit the production, use, import and export of chemicals listed in Annex A of the Convention.
- Control the import of chemicals listed in Annexes A and B of the Convention.
- Eliminate the release the POPs and unintentionally produced POPs (uPOPs).

The Government is committed to and will ensure the availability of the necessary resources and support to:

- Implement the National Waste Management Policy Framework and the Integrated Solid Waste Management System.
- Review and strengthen existing legislation and enforcement systems as they relate to monitoring of POPs and uPOPs.
- Assess and strengthen local environmental and regulatory monitoring and laboratory testing capability for POPs.
- Encourage the adoption of alternative methods, materials and processes to prevent formulation and release of POPs.
- Encourage the application of best available practices (BAT) and best environmental practices (BEP) in managing existing and potential sources of POPs and uPOPs.
- Increase awareness in the general public, industry and government officials about POPs and their risks to human health and the environment.
- Encourage participation by stakeholders in addressing health and environmental effects of POPs and developing appropriate responses to manage human and ecosystem risks from exposure to POPs and uPOPs.
- Continue appropriate research and development into the management of POPs, their effects on human health and the environment and measures to alleviate any such effect.

The Government, even as it continues its quest to further develop the country for the betterment of its citizens, will also strive to protect the environment and the health of its people. The National Policy on POPs will therefore be reviewed periodically to ensure continued relevance and compliance with the Convention.

3.2 Implementation Strategy

Unintentionally produced POPs from Industrial processes, as by-products or waste, are potentially the main source of POPs releases in Trinidad [6], but the estimate of the extent of the problem has significant data gaps [4]. The health effects of such releases are also unknown for Trinidad and Tobago. Therefore, any meaningful strategy for this NIP must include a significant effort to fill data gaps (to the extent practical) in the short term. Similarly, there is insufficient awareness of the issues related to POPs, and as such education and awareness campaigns are key at this point. Behaviour change with respect to waste management is a key long term desired outcome.

In contrast, there is a clear understanding of the laws, regulations and procedures needed to be put in place. There are also major national projects which will help reduce the potential for the release of uPOPs. Therefore, the activities and strategies in Section 3.3 include the following categories:

- Promulgation of Legislation and Regulations.
- Establishing Procedures to be implemented by Government Agencies.
- Information-gathering to fill Data Gaps.
- Major National Projects.
- Stakeholder and Public Awareness.

3.3 Activities, Strategies and Action Plans

3.3.1 Institutional and Regulatory Strengthening

Long Title	Activity: Institutional and regulatory strengthening measures.

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import and export of the chemicals listed in Annex A; and to restrict the production and use of the chemicals listed in Annex B. This section of the NIP addresses:

- Local Enabling Legislation.
- Additions to the Negative List and Customs Regulations.
- Enacting the Waste Management Rules.
- Other Legislation.

3.3.1.1 Local Enabling Legislation

Sammy and McCalla [21] note that Article 3 of the Stockholm Convention is concerned with establishing the legal and administrative framework for eliminating the intentional production and use of POPs. Results of the current study confirm that there is no present production of POPs (as opposed to uPOPs) in Trinidad and Tobago, so legislation would focus on the prevention of new industries that produce POPs. Article 3 of the Stockholm Convention requires Parties to:

- Prohibit and/or take legal and administrative measures necessary to eliminate the production and use (unless exempted) of the 19 POP chemicals listed in Annexes A and B.

- Prohibit and/or take legal and administrative measures necessary to eliminate imports/exports for this purpose (such as allowing movements for the purpose of environmentally sound disposal)

- Assess and regulate, with the aim of preventing the production and use of new chemicals exhibiting POPs characteristics.

To achieve this, legislation must be enacted to ensure that:

- Pesticides and industrial chemicals specified as POPs under the Stockholm Convention are banned from importation, production and use in Trinidad and Tobago.

- Trinidad and Tobago adopt a timetable to monitor and phase out, by the Convention Deadline of 2025, any PCBs still in use, such as PCBs in electrical transformers, ballasts and capacitors.

- Exemptions are provided to allow for the importation of POPs for small-scale research and the laboratory use of analytical standards, as provided for under the Stockholm Convention.

In light of comments made by the Environmental Commission in its Judgement No. EA3/2002 [22], such legislation should also include clear wording that allows the EMA to rely on the provisions of this law as grounds for refusal of any CEC Application for an industry to produce POPs Pesticides or Chemicals.

Two (2) approaches may be used to prepare and enact Local Enabling Legislation:

- A New Law.

- Amendments to the Pesticides and Toxic Chemicals Act (PTCA) and Regulations.

Enacting local enabling legislation for the Stockholm Convention by amendments to the Pesticides and Toxic Chemicals Act and Regulations will require careful drafting to ensure that the appropriate agencies are included. At present, the PTCA creates a Board and Inspectorate (PTCCB and PTCI) under the Ministry of Health. In

contrast, the Focal Point under the Stockholm Convention, the MEAU, operates under the Ministry of the Environment and Water Resources. Such differences will have to be recognized in drafting the amendments, however there are no foreseeable problems in amending the PTCA to become the local enabling legislation for the Stockholm Convention.

The Workgroup on Legislative Actions (see Appendix) at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) felt that the enactment of Local Enabling Legislation was important, and this should be done by amendment to the Pesticides and Toxic Chemicals Act. They did not envisage any challenges having this one law creating the Pesticides and Toxic Chemicals Control Board and also enabling the Stockholm Convention of which the MEAU of the Ministry of the Environment and Water Resources is the National Focal Point. They felt that having two (2) agencies under one Act was not uncommon, and that there already exists a framework for co-operation between these two (2) agencies.

Drafting of either a new law or amendments to the PTCA by an independent consultant would cost approximately $TT 63,000 ($US 10,000).

3.3.1.2 Negative List and Customs Regulations

The Negative List has been cited as an effective mechanism which is being used to control the import of specific chemicals (Ozone Depleting Substances and the POPs Pesticides DDT, Aldrin, Dieldrin and Endrin). It is therefore recommended that other POPs Pesticides and Chemicals be added to the list to control their importation.

New Customs Regulations will also have to be put in place when these new pesticides and chemicals are added to the Negative List [14], [21]. Because the Customs Department is the “front line” agency regarding the control of imports, Sammy and McCalla [21] recommended training for Customs Officers, which would cover:

- Important information for Customs to implement the Convention.
- Safety considerations when dealing with hazardous waste shipments.
- The determination of illegal traffic under national legislation or other measures, and the procedures to detect and/or investigate it.
- Important details to consider when investigating and prosecuting waste crimes.

3.3.1.3 Enacting the Waste Management Rules

Enacting the EMA’s Waste Management Rules (see Section 2.2.4.6) is an important step in the proper regulation of hazardous waste disposal, and is therefore strongly recommended. Once the Waste Management Rules come into force, the EMA will

set up a Unit to manage activities under the Rules. Such a Unit will be staffed with about 12 persons, including a Unit Leader (senior professional), other professionals, technicians and clerical staff. The Report on Best Available Techniques (BAT) and Best Environmental Practices (BEP) to Minimize Releases of uPOPs [7] estimates the cost of enacting the Waste Management Rules as $TT 63,000 ($US 10,000). It also estimated the cost of establishing the new unit and recurrent costs for three (3) years to be $TT 630,000 ($US 100,000).

3.3.1.4 Other Legislation

a) Water Pollution Rules

Both the Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] and the Report on BAT/BEP to Minimize Releases of uPOPs [7] recommend that the EMA's Water Pollution Rules be updated to explicitly include POPs listed in the Stockholm Convention, including at Annex C. The Workgroup on Legislative Actions (see Appendix) at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) expressed some reservations on this, given the very high cost per sample for this testing. They felt that the need for this sampling should be done on a risk-based approach. That is, samples should be tested for POPs only if a review of the operations at that facility indicate a significant potential for the generation and release of POPs and/or uPOPs. Revision to the Rules will require drafting of the revision as well as public consultation on the revision. The Report on BAT/BEP to Minimize Releases of uPOPs [7] estimates the cost of this revision as $TT 31,500 ($US 5,000).

b) Draft Air Pollution Rules

The EMA's draft Air Pollution Rules envisage the regulation of dioxins and furans, and so will be an important tool in the management of uPOPs when implemented. Given how far the draft Rules have been taken in the legislative process, no separate cost is envisaged for laying these Rules in Parliament subject to negative resolution.

The Report on BAT/BEP to Minimize Releases of uPOPs [7] also recommends that the draft Air Pollution Rules be revised, enacted and implemented to cover the Burning of Waste and Lighting Fires at Landfills, Open Burning of Tyres and Non-medical Waste Incineration (including Hazardous Waste Incineration). However, the Workgroup on Legislative Actions (see Appendix) at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) felt that the enforcement mechanisms under the draft Air Pollution Rules were not appropriate for managing fires at landfills, open burning of tyres. They felt that other mechanisms, such as a deposit/refund system for tyres and regulation under the National Solid Waste Strategic Plan, would be more appropriate. This recommended amendment has therefore not been included in this NIP. However, co-ordination between the MEAU of the MEWR and the preparers of the Strategic Plan is required to ensure that these provisions are included.

c) OSH Act

The Report on BAT/BEP to Minimize Releases of uPOPs [7] recommends that the OSH Act be revised to include unintentional POPs as an agent causing occupational diseases. Based on the Precautionary Principle and possible health risks at specific facilities, the Workgroup on Legislative Actions (see Appendix) at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) recommended that amendments to the OSH Act should be done in Year 1. However, this can be removed at a later date depending on the results of scientific research. They also felt that some training of medical practitioners would be required to verify the effects of uPOPs on workers. The estimated cost of amending the OSH Act is $TT 31,500 ($US 5,000).

d) Beverage Containers Bill

The Report on BAT/BEP to Minimize Releases of uPOPs [7] recommends that the Beverage Containers Bill be enacted and implemented and estimates the cost at $TT 126,000 ($US 20,000).

3.3.2 Releases from Intentional Production and Use

Long Title	Activity: measures to reduce or eliminate releases from intentional production and use.

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import and export of the chemicals listed in Annex A; and to restrict the production and use of the chemicals listed in Annex B. However, as noted in Section 2.3.6, there is no production of POPs pesticides or chemicals in Trinidad and Tobago. Mirex-S is the only POPs pesticide still in use in the country, under an exemption under the Stockholm Convention; and there are also some old PCB transformers that are coming to the end of their useful life. Action regarding Mirex-S will be discussed in Section 3.3.5.2, and action to manage the disposal decommissioned PCB Transformers and other electrical equipment will be discussed in Section 3.3.4.

3.3.3 Annex A, Part 1, Pesticides and Chemicals

Long Title	Activity: production, import and export, use, stockpiles and wastes of Annex A POPs pesticides.

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import and export of the chemicals listed in Annex A, but as noted in Section 2.3.1, there are no Annex A Pesticides produced or used in Trinidad and Tobago at this time. Therefore, there is no need for action on Annex A, Part 1, pesticides and chemicals at this time.

3.3.4 PCBs and PCB Equipment

Long Title	Activity: production, import and export, use, identification, labelling, removal, storage and disposal of PCBs and equipment containing PCBs.

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import and export of the chemicals listed in Annex A. Any transformers, capacitors, etc. manufactured before 1980 have the potential to be PCB-containing. In Trinidad and Tobago there is evidence [19] that some industries are arranging to dispose of such equipment in a responsible manner when they reach the end of their useful life.

The appropriate legal instrument for managing disposal of PCBs and PCB-containing material is the Waste Management Rules (see Section 2.2.4.6), so the implementation of those rules is critical to successful management of such material. Two (2) other actions are recommended with regard to potential PCB-containing equipment:

- Circulate information to industries concerning the responsible disposal of PCB-containing equipment.

- Conduct a survey of potential PCB-containing equipment.

It is recommended that the MEAU of the MEWR or the PTCI develop a one-page article on PCBs, including:

- Basic Information on PCBs, including health and environmental effects.

- Likely PCB-containing Equipment.

- Safe Handling of PCB-containing material.

- Responsible disposal of PCBs.

This article should be published in the Newsletters of the various Industry Associations (the Energy Chamber, the Chamber of Industry and Commerce, the Trinidad and Tobago Manufacturers Association, etc.). It can also be mailed out directly to industries, based on Tenant Lists that can be obtained from existing Industrial Estates.

The Workgroup on Assistance to Industries (see Appendix) at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) felt that a large number of PCB Transformers would be decommissioned in the next few years. They therefore felt that dissemination of information via newsletter articles is a good

approach. An estimated cost of $TT 63,000 ($US 10,000) would be appropriate for this activity.

It is recommended that the MEAU of the MEWR commission a survey of power companies and larger industries that may have transformers or other electrical equipment that was manufactured prior to 1980. The steps in such a survey would be as follows:

i. Review information on power companies, industries and large commercial establishments operating in Trinidad and Tobago, based on Tenant Lists from existing Industrial Estates. Information on industries can also be requested from Industry Associations (the Energy Chamber, the Chamber of Industry and Commerce, the Trinidad and Tobago Manufacturers Association, etc.).

ii. Short-list those industries that have been in operation before 1980.

iii. Circulate a questionnaire to the short-listed industries to obtain information on age of electrical equipment in use at the facility, as well any decommissioned electrical equipment that is stored at the facility.

iv. Follow-up with phone calls and visits (as required).

v. Prepare an estimate of the likely number of PCB-containing transformers and other electrical equipment in the country.

The estimated cost of hiring an independent consultant to undertake such a survey is $TT 95,000 ($US 15,000).

3.3.5 Schedule B Chemicals

Long Title	Activity: production, import and export, use, stockpiles and wastes of DDT and PFOS.

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to restrict the production and use of the chemicals listed in Annex B.

3.3.5.1 Dichlorodiphenyltrichloroethane (DDT)

As noted in Section 2.3.3, DDT has been delisted by the PTCCB, and the ban is generally effective. The only reported instances of “contraband” relate to household mosquito coils and mats. One approach to minimizing the use (and hence the importation) of such items would be to make the public aware of the dangers of their use. Recommendations for a public awareness campaign are included in Section 3.3.13.1, below.

3.3.5.2 Perflorooctane Sulphonic Acid (PFOS)

The POPs Inventory Report [4] indicates that a bait for leaf-cutting ants, Mirex-S (containing PFOS), is imported under an Exemption under the Stockholm Convention. As noted in Section 2.3.6, there are viable alternatives to the use of Mirex-S, so this chemical can be deregistered without adverse impacts on farming. In fact, the importation of this chemical has been significantly reduced in recent years due to a preference for the alternatives. It is therefore possible that market forces will lead to a discontinuation of the use of Mirex-S, regardless of regulatory action to deregister it.

3.3.6 Exemptions

Long Title	Activity: register for specific exemptions and the continuing need for exemptions.

Article 4 of the Stockholm Convention sets up a register of specific exemptions. The only exemption under the Stockholm Convention currently invoked by Trinidad and Tobago relates to the importation of Mirex-S (which contains a PFOS). When this is de-registered, this exemption will no longer be used by Trinidad and Tobago.

3.3.7 Reducing Releases of uPOPs

Long Title	Action plan: measures to reduce releases from unintentional production.

Article 5 of the Stockholm Convention requires Parties to undertake measures to reduce or eliminate releases of POPs from unintentional production. While potential sources of uPOPs have been identified using international guidance documents; there has, to date, been no country-specific studies to confirm and document releases of uPOPs. Reducing releases of uPOPs would therefore involve the following tasks:

- Updating POPs Inventory.
- Studies to confirm emission of uPOPs from the Refinery.
- Studies to confirm emission of uPOPs from Landfills.
- Studies to confirm uPOPs in Leachate at Landfills.
- Health Screening.
- Reduction of Open Burning.
- Other Actions to reduce releases of uPOPs.

3.3.7.1 Updating the POPs Inventory

The POPs inventory prepared by the POPs Inventory Report [4] indicates a significant level of uncertainty regarding the production of unintentionally produced

POPs, and steps should be taken to close this information gap. The study recommends that the MEAU of the MEWR should commission the following:

- Review and update Trinidad and Tobago Release Inventory of unintentional formation and release of POPs listed in Annex C in 2016/2017 using international protocols for inventory preparation at an estimated cost of $TT 284,000 ($US 45,000).

- Develop data collection and management systems for critical source categories for which there are current data gaps including Burning of Agricultural Residue (in field); Landfill Leachate; Open Water Dumping; Sewage/Sewage Treatment; Waste Oil Dumping and Uncontrolled Domestic Waste Burning and Transport at an estimated cost of $TT 126,000 ($US 20,000).

- Review and revise data collection and management system for existing source categories at an estimated cost of $TT 126,000 ($US 20,000).

The total estimated cost of this update is $TT 536,000 ($US 85,000). This update may also explore other sources of POPs chemicals, such as chemicals used in expanded polystyrene used for construction and cold storage, as well as flame retardants used in automobile seats (especially in the seats of older vehicles imported as foreign-used). There are several local consulting firms that can undertake this update, and the cadre of trained personnel (see Section 3.4) will also have this capability.

3.3.7.2 uPOPs Emissions from the Refinery

The POPs Inventory Report [4] identified the production of Chemicals and Consumer Goods as by far the largest potential source of uPOPs, and the Petroleum Refinery as the major potential source within this category. All of the estimated uPOPs releases from the refinery were to the air. The Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] also identifies waste incineration and metal processing facilities as potential sources of uPOPs requiring further study.

Monitoring of uPOPs in air is described in several references [24], [25] and [26], the following description being typical:

> *"Samples were collected through a glass fibre pre-filter and a polyurethane foam filter (PUF) using a PS-1 high volume air-sampling device. Every six days, the glass fibre pre-filter was replaced and maintenance was performed on the sampling device. After thirty days, the polyurethane foam filter was harvested and combined in a container with the four glass fibre pre-filters. The samples were analysed for a series of dioxins and dioxin-like compounds by EPA's Environmental Chemistry Laboratory using high-resolution gas chromatography/high resolution mass spectrometry in accordance with*

EPA Method 1613. These include polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, and coplanar polychlorinated biphenyls" [24].

A possible air quality monitoring program for uPOPs adjacent to the Pointe-a-Pierre Refinery would involve the following steps:

i. Obtain from PETROTRIN information on flaring and other air emissions at the Refinery, and similar information for waste incineration and metal processing facilities.

ii. Undertake simple air dispersion modelling to estimate locations where uPOPs are likely to be present in ambient air adjacent to each target facility. These will be downwind locations, at some distance from the source. The Pointe-a-Pierre location of the Refinery poses some challenges, since some of the prime monitoring locations will be in the sea. From the modelling, identify three "most likely" monitoring locations downwind of the Refinery.

iii. Deploy one high-volume sampler at each monitoring location (three total), and run for a period of for 90 days (replacing the glass pre-filters every six (6) days and replacing the foam filters every 30 days as per description above). Test the foam filters as described above.

iv. Prepare a report that documents the presence (or otherwise) of uPOPs in ambient air at each target facility. If uPOPs are present, discuss measured concentrations in the context of human health effects.

The estimated cost of such a program is $TT 630,000 ($US 100,000). At least two (2) local firms have local capability to deploy high-volume air samplers. Both can therefore undertake this program, but some equipment (specialized filters) will have to be imported and some tests may have to be done at laboratories abroad. Depending on the results of this air quality survey, actions may be prescribed to improve the performance of the flares to minimize the production and emission of uPOPs.

3.3.7.3 uPOPs Emissions from Landfills

Both The Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] and the Report on BAT/BEP to Minimize Releases of uPOPs [7] identified unauthorized burning at landfills in Trinidad as a significant potential source of uPOPs. SWMCOL has indicated that air quality studies are being undertaken at the Guanapo Landfill by the Department of Chemistry, UWI. Unfortunately, POPs and uPOPs are not included among the parameters being tested for, due to the high cost of such testing.

An air quality monitoring program can be undertaken at each of the three (3) landfills in Trinidad, similar in nature to the program described in Section 3.3.7.3. Burning at the landfills is done without the consent of the landfill operator, so records will have to be kept on the incidence of burning on a day-to-day basis. The presence of

uPOPs can then be correlated with the number of days with significant burning in a particular 30-day period. The cost of three (3) programs is estimated at $TT 1.9 million ($US 300,000).

3.3.7.4 uPOPs in Leachate from Landfills

The Report on BAT/BEP to Minimize Releases of uPOPs [7] also identified Dumps of Waste and Residues as the major hot spots of uPOPs in water and on land. Because of the mixed disposal of garbage in Trinidad and Tobago, including the co-mingling of some industrial waste in the past, all four (4) landfills (see Section 2.1.3.4) should be investigated.
Such a program would consist of the following steps:

i. Visit each landfill and identify locations at which samples of leachate can be taken. At the Studley Park Landfill, samples can be taken from the leachate collection system. At the other locations it may be necessary to install sampling wells at down-gradient locations. A minimum of two (2) sampling locations should be established at each Trinidad landfill.

ii. Samples of leachate should be taken monthly for during six (6) months, three (3) in the wet season and three (3) in the wet season.

iii. Samples should be delivered to an accredited laboratory under strict chain of custody procedures. At the laboratory they should be tested for the presence of dioxins and furans.

iv. Prepare a report that documents the presence (or otherwise) of uPOPs in leachate. If uPOPs are present, discuss measured concentrations in the context of human health effects.

The estimated cost of such a program at each of the four (4) landfills, including the cost of establishing sampling wells, sampling and testing is $TT 200,000 ($US 32,000). These costs may be reduced somewhat if this program can be “piggy-backed” on the existing SWMCOL leachate testing program (see Section 2.3.7), particularly if samples can be taken from the same observation wells (thus avoiding the cost of installing new wells). The potential for such saving can be explored when this program is being set up.

3.3.7.5 Health Screening

The Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] recommends that baseline health assessment studies should be undertaken in at-risk communities, and periodically. Such studies would be initiated if the presence of uPOPs in air is confirmed (see Section 3.3.7.1) or if the presence of uPOPs in landfill leachate is confirmed (see Section 3.3.7.2). Such studies would focus on POPs-related diseases, including respiratory diseases and cancers. Such studies can be done by the Ministry of Health.

The Workgroup on Technical Actions (see Appendix) at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) recommended that the design of the Health Screening Program should be undertaken in Year 1. It should not wait until the completion of testing of air quality and landfill leachate to confirm the presence of uPOPs, since there is a great need to ascertain/confirm the health risks associated with uPOPs in the country. They also recommended that this program should be implemented as soon as it has been designed.

3.3.7.6 Reduction of Open Burning

The Report on BAT/BEP to Minimize Releases of uPOPs [7] recommends two (2) studies pertaining to open burning:

- Review the present situation regarding open burning (such as for land clearance and disposal of agricultural waste).

- Prepare appropriate and modern guidelines to control open burning (agricultural waste, household waste, commercial waste, etc.).

There is an estimated combined cost of $TT 284,000 ($US 45,000) for these studies.

The Report on BAT/BEP to Minimize Releases of uPOPs [7] also recommends that open burning of agricultural residue and household garbage can be addressed by:

- Farmer Awareness of alternatives to burning of agricultural residue.

- Public Awareness of alternatives to burning household garbage, including composting.

- Public Awareness of steps to be taken to avoid accidental setting of bush and forest fires.

Participants at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) indicated that some work is already being done to inform farmers of alternatives to burning. The Report on BAT/BEP to Minimize Releases of uPOPs [7] estimates a combined cost of $TT 252,000 ($US 40,000) for these studies and awareness programs. However, such efforts would ultimately require a culture change on the part of the public and farmers.

3.3.7.7 Other Actions to Reduce uPOPs Releases

The results of the studies described above will indicate the extent of the uPOPs problem in Trinidad and Tobago, and whether action is needed to reduce releases of uPOPs. The Report on BAT/BEP to Minimize Releases of uPOPs [7] lists a number

of actions which may be implemented to reduce releases of uPOPs, should this be necessary.

These are summarized under the following headings (several actions are listed under each heading):

- Promoting the development and use of substitute or modified materials, products and processes to prevent the formation and release of uPOPs with an estimated cost of $TT 473,000 ($US 75,000).

- Promoting the use BAT/BEP for existing and new sources of release of uPOPs (See Section 3.3.17.1).

- Promoting improvements to flaring equipment and practices to reduce the generation of uPOPs (see Section 3.3.17.2).

3.3.8 Releases from Stockpiles and Waste

Long Title	Activity: measures to reduce releases from stockpiles and wastes.

Article 6 of the Stockholm Convention requires Parties to undertake measures to reduce or eliminate releases from stockpiles and waste.

3.3.8.1 Stockpiles

With regard to stockpiles of POPs pesticides and chemicals:

- The PTCI reported no stockpiles of obsolete pesticides in the country following their 2011/2012 survey [4].

- The management of PBC-containing equipment was discussed in Section 3.3.4.

- Apart from PCB-containing electrical equipment, there were no reports of industries manufacturing or using POPs chemicals [16].

3.3.8.2 Waste

The POPs Inventory Report [4] identified the lack of information on landfill leachate as a data gap of high importance, and the Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] notes health concerns related with open burning at Beetham, Guanapo and Forres Park. In Trinidad, consolidation of all municipal waste disposal at a single location with the closure of the other landfills has been discussed for many decades, and has been raised again recently [27].

The MEAU of the MEWR provided more specific information about plans to rationalize solid waste handling and disposal in Trinidad and Tobago. The Government has received several proposals for such rationalization, and is presently considering one that will recover salvageable material from the waste, use composting to reduce waste volume and dispose the remainder in a single landfill. This initiative, if selected, will be pursued as a Public-Private Sector initiative. However, as SWMCOL has noted, there is no firm schedule for this development. This solid waste rationalization project is a major initiative, outside the scope of this NIP.

The Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6] also cautions that the closure of the Beetham Landfill will result in a significant loss of earnings in the already-depressed Beetham Gardens community. For this reason, *"something will need to be done to better manage the situation at the landfills, in particular the Beetham Landfill. If, for example, initiatives are taken to close the Landfill and relocate somewhere else this will impact directly on the current sources of income for a large number of persons who "work" as salvagers. This will ensure that since no new waste is being brought to the site, there will be no incentive to engage in open burning. On the other hand associated criminal activity may also be curbed as a by-product of a properly managed closure".*

While there is no doubt that closure of any of the landfills in Trinidad with proper covering will effectively eliminate the problem of open burning, the same cannot be said for leachate. The Beetham Landfill was originally built on a mangrove swamp, without a liner (or any engineered bottom layer). Therefore, there is continuous inflow of water into the layers of garbage that are below sea level. In this situation, leaching from this landfill may be expected to continue for many years (or decades) after closure and the elimination of infiltration from the surface. Similarly, the Guanapo Landfill sits on the bank of a river which periodically overflows its banks. Therefore, closure of the Guanapo Landfill will require not only sufficient cover to prevent infiltration from the surface, but also a barrier between the river and the layers of garbage to prevent lateral infiltration when the river overflows. The exception is the Forres Park Landfill which is built on a relatively impervious clay.

3.3.9 Identification of Stockpiles, Articles in Use and Waste

Article 6 of the Stockholm Convention requires Parties to undertake measures to reduce or eliminate releases from stockpiles and waste. However, as noted in Section 2.3.5, a survey by the PTCI has indicated no stockpiles of POPs Pesticides in Trinidad and Tobago. However transformers and other electrical equipment made before 1980 have the potential to contain PCBs. A survey to document the presence of likely PCB-containing electrical equipment in Trinidad and Tobago was described in Section 3.3.4.

It is important to document historical stockpiles of POPs Pesticides so that contamination testing can be conducted at those sites. The MEAU of the MEWR should commission a survey of Caroni 1975 Limited and other large plantations, as well as suppliers of pesticides.

The steps in such a survey would be as follows:

i. Assemble a list of target organizations that have imported or used large amounts of pesticides in the past.

ii. Circulate a questionnaire to the selected industries to obtain information on the importation or use of POPs Pesticides, and locations where they were stored.

iii. Follow-up with phone calls and visits (as required).

iv. Prepare a listing of sites that are potentially contaminated with POPs Pesticides.

The estimated cost of hiring an independent consultant to undertake such a survey is $TT 80,000 ($US 12,500).

3.3.10 Hauling and Disposal

Long Title	Manage stockpiles and appropriate measures for handling and disposal of articles in use.

Article 6 of the Stockholm Convention requires Parties to take appropriate measures to ensure that POPs materials are handled, collected, transported and stored in an environmentally sound manner; and disposed of in such a way that the POPs Content is destroyed or irreversibly transformed.

3.3.10.1 Hauling

There is, at present, no formal system to regulate the haulage of hazardous material on the roads of Trinidad and Tobago. In 2006, Ecoengineering [28] noted that all of the nine (9) major categories of hazardous material are presently being transported on the roads of Trinidad and Tobago, with significant variations in sizes and frequency of consignments. The report recommended that a hazardous transport road system for Trinidad and Tobago should be established as a matter of priority.

This recommended system would be implemented as a Regulation under the Motor Vehicles and Road Traffic Act and regulations would recognize various parties in the regulatory community as well as different parties in the regulated community. The System would also have roles for the Licensing Department, the Police Service, the Environmental Management Authority and the Environmental Unit of the Ministry of Works and Transport.

3.3.10.2 Disposal

As noted in Section 2.3.10.1, there is already a capability to treat and /or dispose of POPs pesticides and spent chemicals. What is required, however, is proper

regulation of this industry. This can be accomplished by the enactment of the EMA's Waste Management Rules (see Section 2.2.4.6).

3.3.11 Contaminated Sites and Remediation

Long Title	Strategy: identification of contaminated sites and remediation in an environmentally sound manner.

Article 6 of the Stockholm Convention requires Parties to endeavour to develop appropriate strategies for identifying sites contaminated by chemicals listed in Annexes A, B or C. The first step under this heading is the identification of POPs-contaminated sites. The investigations described in Section 3.3.4 will identify sites potentially contaminated with PCBs, while the investigations described in Section 3.3.9 will identify sites potentially contaminated with POPs pesticides; and these must be investigated further.

The MEAU of the MEWR has stated that a regional project is presently being developed to request funding from the Global Environmental Fund, and that funding for field investigations of the type described below may be available from that project. Several local firms have the capability to undertake the contamination studies described below. Sampling equipment is available locally, but some of the testing may have to be done abroad.

3.3.11.1 Decommissioned Electrical Equipment

With regard to storage of decommissioned electrical equipment, enquiries should be made of:

- The Trinidad and Tobago Electricity Commission (T&TEC)
- The Power Generation Company of Trinidad and Tobago Ltd. (POWERGEN)
- The Petroleum Company of Trinidad and Tobago (PETROTRIN).
- The Ministry of Works and Infrastructure.
- The Ministry of Energy and Energy Affairs.
- The Water and Sewerage Authority (WASA).
- Telecommunications Services of Trinidad and Tobago (TSTT).

Information from the survey described in Section 3.3.4 will also be useful here.

It is important to screen the PCB-contaminated sites to identify those with a potential for significant contamination. A site where a single transformer was stored, for example, does not constitute a great risk to persons or the environment. And it is simply not cost-effective to sample and test at sites where the risk involves relatively small volumes of contaminants. At the sites which are identified as having the potential for significant contamination, samples of soil would be taken just below the surface and at a depth of about 1 m; and these samples would be tested for PCBs. Assuming ten (10) such sampling locations on a typical site (20 samples, total), the

estimated cost of sampling and testing would be of the order of $TT 58,000 ($US 9,000) per site.

3.3.11.2 Pesticide Storage

It has been established that there are presently no stockpiles of POPs pesticides in the country. With regard to past contamination, enquiries should be made of:

- Caroni (1975) Limited.
- The Ministry of Food Production.
- Importers of Agrochemicals.

As with PCB-contaminated sites (see Section 3.3.11.1, above), it is important to screen the pesticide storage sites to identify those with a potential for significant contamination. At such sites, samples of soil would be taken just below the surface and at a depth of about 1 m; and these samples would be tested for Organochloride Pesticides. Again assuming ten (10) such sampling locations on a typical site (20 samples, total), the estimated cost of sampling and testing would be of the order of $TT 90,000 ($US 14,300) per site.

3.3.11.3 Remediation

The selection of appropriate remediation measures can only be done after the nature and extent of contamination on any given site has been determined.

3.3.12 Information Exchange and Stakeholder Involvement

Long Title	Activity: facilitating or undertaking information exchange and stakeholder involvement.

Article 9 of the Stockholm Convention requires each Party to facilitate or undertake the exchange of information with the Secretariat and other Parties.

3.3.12.1 Information Exchange

Under Article 9 of the Stockholm Convention, Trinidad and Tobago has a responsibility to facilitate the exchange of information related to:

- The reduction or elimination of the production, use and release of persistent organic pollutants (POPs).

- Alternatives to POPs, including information relating to their risk as well as to their economic and social costs.

This section discusses and makes recommendations pertaining to the exchange of information between Trinidad and Tobago and other parties to the Stockholm

Convention. Information and recommendations on the provision of information to the general public will be addressed in Section 3.3.13.

It is not clear how much information on reduction/elimination of and alternatives to POPs is presently available in Trinidad and Tobago; but Sammy and McCalla [21] note that as of 2011, information exchange was done on an ad hoc basis. They recommended that the system for requesting information on reduction or elimination of POPs and alternatives to POPs should be formalized.

The formal system envisaged by Sammy and McCalla [21] would require the development of a database of citations for such information. This would be used to respond to questions from other Parties to the Stockholm Convention, and may be extended to include information requests from industries, research organizations and government agencies; both local and international. It would be cost effective to develop a single data-base relative to POPs as well as Hazardous Chemicals and Pesticides covered by the Rotterdam Convention.

The following comments relate to the establishment of the data-base described above:

- The MEAU of the MEWR appears to be the appropriate organization to develop and maintain this database.

- The data-base would consist of citations of sources, information on and links to relevant websites (as appropriate) and a listing of the type of information each document contains.

- The database should clearly flag information which is not in the public domain, with a notation that such information must be requested and released directly by its owner.

If this data-base is established on-line, persons requesting information can review it themselves and contact the owners of documents directly to request copies of the full documents. If the data-base is not available on-line, the designated officer of the MEAU of the MEWR will have to review it on behalf of the person making the request and respond with a listing of relevant documents. The person making the request can then contact the owners of documents to request copies of the full documents. In this latter case, consideration may be given to charging an administrative fee.

3.3.12.2 Stakeholder Involvement

No separate recommendation is made regarding stakeholder involvement (implicitly recognizing a public right-to-know), since it is required under existing and proposed regulations.

Under the Pesticides (Registration and Import Licensing) Regulations issued under the Pesticides and Toxic Chemicals Act:

- The PTCCB must publish a notice containing the common name, active ingredients and intended use of the pesticide, for the purpose of inviting public comments on each application for registration of a pesticide.

- Any person can object to the registration of a pesticide if it is not safe, constitutes a hazard to public health, domestic animals, or other animals, will produce adverse effects to soil, air and water; or it may result in a long-lasting pollution of the water or land.

- The PTCCB must keep a public register of approved pesticides.

Under the Environmental Management Act:

- Public Comment must be considered in the making of Rules.

- Any application which requires the preparation of an environment impact assessment must be submitted for public comment before a CEC is issued by the EMA.

- Allows direct third party legal action by members of the public.

Under the Certificate of Environmental Clearance (CEC) Rules issued under the Environmental Management Act:

- The Applicant, where appropriate, is required to conduct consultations with relevant agencies, non-governmental organisations and other members of the public on the draft Terms of Reference (TOR) that is issued by the EMA.

- The holder of a CEC must display it publicly.

- The EMA must keep a public register of CECs issued, and must provide copies to members of the public.

- The EMA may reject a claim of confidentiality if, in its view, the public interest in disclosing the information clearly outweighs any prejudice to the applicant.

The EMA has adopted a practice of mandating the distribution of information to the public before a CEC is issued, whether or not an EIA is required.

Under the draft Waste Management Rules:

- The application for a waste facility license must include details of plans for public consultation.

- The EMA must keep a Waste Management Register which is open to the public.

- The EMA may reject a claim of confidentiality if, in its view, the public interest in disclosing the information clearly outweighs any prejudice to the applicant.

3.3.13 Public Awareness, Information and Education

Article 10 seeks to encourage, within the capabilities of the Party, public information, awareness and education. Two (2) recommendations are made regarding public awareness, information and education on the Stockholm Convention and POPs:

- A Public Awareness Campaign.
- A Publicly-Accessible On-line Database.

This section discusses and makes recommendations pertaining to the provision of information to the general public. Information and recommendations on the exchange of information between Trinidad and Tobago and other parties to the Stockholm Convention were addressed in Section 3.3.12.1.

3.3.13.1 Public Awareness Campaign

The Report on Socio-Economic Considerations related to the Management of POPs [6], the National Profile on Chemical and Waste Management in Trinidad and Tobago [5] and Sammy and McCalla [21] all recognize the need for greater public awareness of POPs, with Sammy and McCalla [21] noting that public awareness of POPs in Trinidad and Tobago is very low.

There is, however, a concern about premature release of information. At the present time, POPs chemicals and pesticides appear to be well-controlled in Trinidad and Tobago, and there is a lack of definitive information on uPOPs. It would be imprudent to raise a level of public concern (or even panic) about POPs and uPOPs, only to later confirm that there is not a problem. The MEAU of the MEWR has expressed the view that the public awareness campaign should focus on the NIP in the first instance, and only proceed to other topics when more information is available. Such an introductory campaign can maximize the use of gratis opportunities (Government Programs on Radio and Television, for example), but some costs would be incurred for newspaper advertisements, etc.

Participants in the Workgroup on Awareness and Information at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) felt that this program should state the reason for the NIP and the rational for implementation. It should be carefully designed to avoid creating alarm when explaining the potential negative impacts. The cost of designing and implementing an initial campaign is approximately $TT 100,000 ($US 16,000).

A Public Awareness Campaign (PAC) [29] on this topic was developed following the process shown in Figure 7. The primary target audience for this PAC is defined as *"the general public who are not aware of the dangers of POPs on human health, environment and the food chain"*. The dissemination strategy is based on:

1. Use Celebrity voice/image.
2. Trinidad and Tobago Postal Corporation (TTPost) Mail-out to households.
3. Free media.
4. Paid media.
5. Social media – Website/webpage, Facebook, You Tube, links.
6. Learning sessions at companies, NGOs, communities, GORTT.
7. Distribution of information based items - Notepad, calendars, t-shirts, DVD, brochures, bookmarks, PowerPoint presentations.
8. Viral video.
9. Newspaper insert.
10. Manned/Unmanned displays at Malls (Incl. Movie Towne, Schools, Companies).
11. Radio.
12. Television.
13. Cinema.
14. Touch screen at movie - Combination of all material.

The Basel Convention Regional Centre (BCRC) has indicated a willingness to advise on the preparation of material for this public awareness campaign as may be required. The estimated cost of this PAC is $TT 1.45 million ($US 230,000). If it is considered appropriate, this program can be expanded to include the Basel Convention and the Rotterdam Convention.

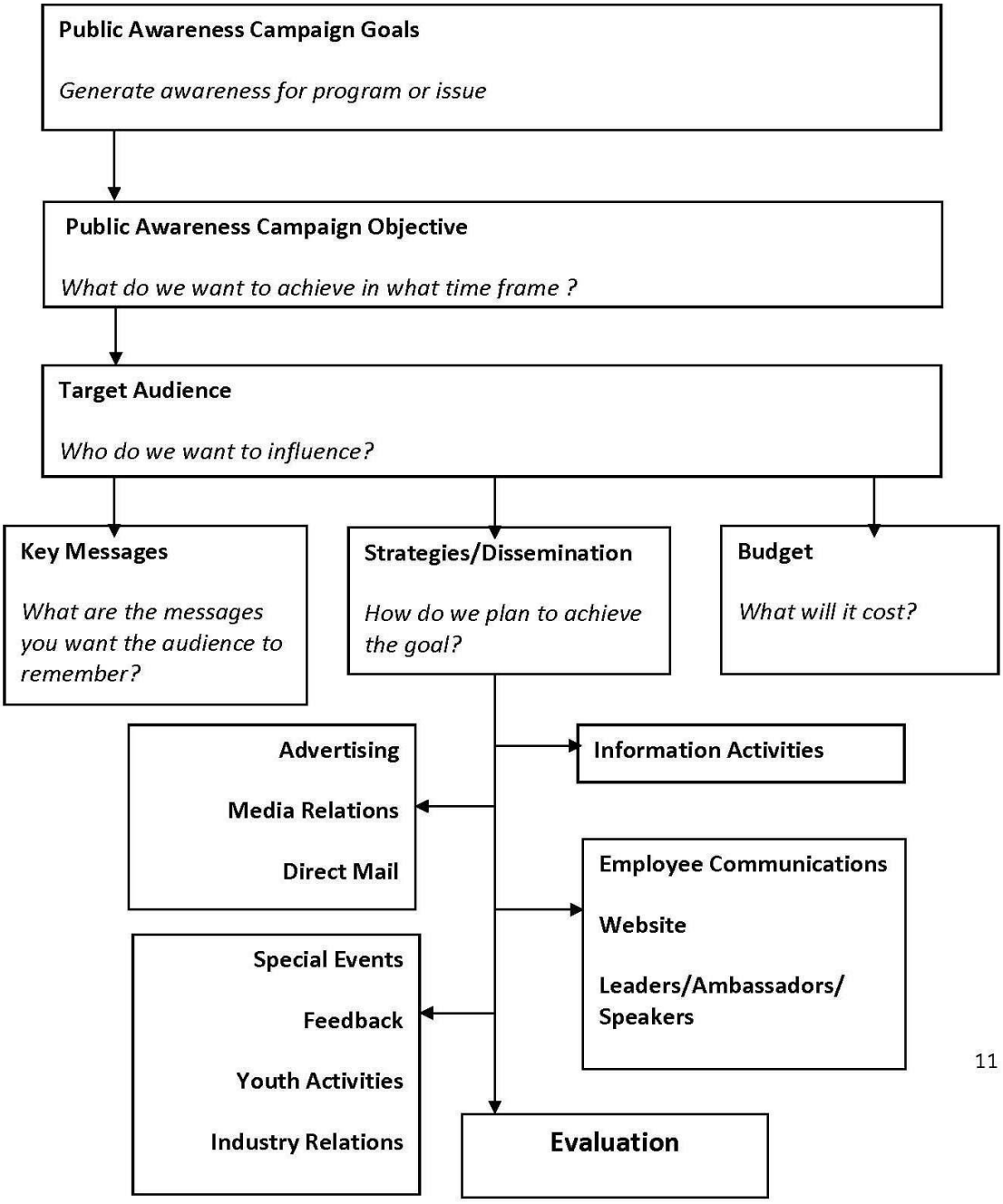

FIGURE 7. PROCESS FOR DEVELOPING THE PUBLIC AWARENESS CAMPAIGN (PAC)

The Public Awareness Campaign [29] also describes a more limited PAC, consisting of:

1. Free Media Campaign.
2. Free Celebrity Endorsement.
3. Mall Displays.
4. Social Network,
5. Letter Writing Campaign.
6. Website.

The estimated cost of this more limited campaign is $TT 333,100 ($US 53,000). Based on available information, participants in the Workgroup on Awareness and Information at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) felt that the more limited program is likely to be more appropriate than the full campaign.

There are also several resources available locally to the designers of the Public Awareness Campaign. Both the BCRC and the EMA have experience in disseminating technical information to the public, and both have expressed a willingness to assist in the preparation of the Stockholm Convention / POPs Campaign, if necessary. The EMA has also indicated their willingness to distribute information on POPs and uPOPs as part of the EMA's general information campaigns.

3.3.13.2 On-line Database

Sammy and McCalla [21] note that *"Trinidad and Tobago is significantly closer to having a public database of hazardous chemicals and pesticides than public databases for hazardous wastes or persistent organic pollutants. The Pesticides and Toxic Chemicals Inspectorate presently disseminates information to the public on a 'walk-in' basis, and are in the process of developing this into an on-line service. The Ministry of Food Production, Land and Marine Affairs disseminates information on pesticides to farmers, and the Ministry of Energy and Energy Affairs regulates chemicals used in the petroleum industry. All of this information provides an effective working platform to develop the publicly-available database"*.

Dissemination of information would be greatly advanced if this information were placed on a publicly-available data-base. The first step would be to screen the information to exclude any that is not in the public domain. Then a web site would be set up and the information uploaded. The BCRC has indicated an interest in such a website. They can assist by identifying other websites that can be linked to this website, and also by alerting when new sources of relevant information become available.

Participants in the Workgroup on Awareness and Information at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) felt the On-Line

Database would be extremely useful, and could be used by NGOs, schools, etc., for sensitization and training. The database should be user-friendly, and if possible the information should be categorized by industry type.

The cost of establishing a publicly-accessible web site, including the scanning of information that is not available in digital format and then uploading approximately 5,000 pages of information has been estimated at $TT 50,000 ($US 8,000). There are many local firms that can assist the PTCI in developing this web site, some of which are listed in the Acknowledgements at the start of this NIP.

3.3.14 Effectiveness Evaluation

Two (2) levels of evaluation of this NIP are envisaged:

- Annual Updates.
- Formal Audits.

3.3.14.1 Annual Updates

Within six (6) weeks of the end of each year of the NIP, the MEAU of the MEWR can review the Action Items for the preceding year in the NIP and report on progress in implementation. For each Action, this report could also indicate whether the Action was completed, and if not:

- Reasons for non-completion.

- Actions and resources to ensure completion in the next year of the NIP.

The report can then be forwarded to the Permanent Secretary of the MEWR to be forwarded to the Minister for decisions and actions. Since this report will likely be prepared by the staff of the MEAU, there should be no separate cost.

3.3.14.2 Auditing the NIP

Article 16 of the Stockholm Convention requires Parties to periodically evaluate the effectiveness of the Convention. A formal audit of the NIP will be undertaken at the end of Years 3 and 5 (in each case, within 3 months of the end of the year). These Audits will be undertaken in general accordance with ISO 19011:2011, Guidelines for Auditing Management Systems. Such an Audit will focus both on the completion of Actions under the NIP and on success in achieving the objectives of the Stockholm Convention. The effectiveness may be gauged by key indicators, examples of which are shown in Table 9. This table focuses on additional studies, remediation actions, etc. Measures of Success relative to the enactment of new laws and provision of additional staffing and training will be discussed in Section 3.5. The cost of one such audit is approximately $TT 200,000 ($US 32,000).

TABLE 9. KEY INDICATORS FOR EVALUATING EFFECTIVENESS

No.	ACTION	SEE SECTION	INDICATOR
1	Phase out the use of PCB Containing Electrical Equipment.	3.3.4	Decommissioning and environmentally-sound disposal (over time) of the potential PCB Containing Equipment identified in the survey.
2	Identify a suitable alternative and phase out the use of Mirex-S.	3.3.5.2	Mirex-S deregistered by the PTCCB.
3	Improvements to the flares at the Pointe-a-Pierre Refinery.	3.3.7.2	Compare the results of initial air quality testing with results after improvements.
4	Consolidate landfills in Trinidad to a single, better-controlled site.	3.3.7.3' 3.3.8.2	Compare results of leachate tests at the present landfills with results of tests at the new consolidated landfill.
5	Remediate Contaminated Sites	3.3.11.1, 3.3.11.2	Number of sites that are successfully remediated, compared to the number that are identified.

3.3.15 Reporting

Article 15 of the Stockholm Convention requires Parties to report on measures taken to implement provisions of the Convention, and the effectiveness of those measures. This was discussed in Section 3.3.14, above. Other notifications and reports required under the Stockholm Convention include:

- Proposing the listing of chemicals in Annexes A, B or C.
- Registering specific exemptions to the Lists in Annexes A and B.
- Statistical Data on production, import and export of the chemicals listed in Annexes A or B.

3.3.15.1 Registering Chemicals and Exemptions

To date, Trinidad and Tobago has not proposed the listing of any chemicals under the Stockholm Convention, nor did the country register any specific exemptions on becoming a Party to the Convention under Article 4:3.

Should Trinidad and Tobago wish to propose the listing of any chemicals, Notification will be prepared and submitted by the MEAU of the MEWR. In 2011, the Ministry strengthened the MEAU by hiring four (4) additional specialists. The Waste Management Specialist deals with matters related to the Stockholm, Rotterdam and Basel Conventions. Given the fact that so few POPs are presently used in Trinidad and Tobago, and that none are produced here, it is unlikely that additional staff will be required to handle Notifications.

Sammy and McCalla [21] note *that decisions concerning the listing of chemicals in Annexes A or B, invoking exemptions or extending exemptions in Annexes A or B would require information on current use of those chemical in Trinidad and Tobago, whether practical alternatives are available, and the time required for change-over to the alternative. Financial, implications of the change-over and environmental and human health implications of delaying the change-over must also be considered.*

In determining the need for any of those actions, the MEAU-MEWR should consult a wide range of stakeholders, including the:

- *Pesticides and Toxic Chemicals Control Board /PTCI.*
- *Environmental Management Authority.*
- *Ministry Food Production, Land and Marine Affairs.*
- *Ministry of Energy and Energy Affairs.*
- *Tobago House of Assembly.*
- *Trinidad and Tobago Bureau of Standards.*
- *Caribbean Industrial Research Institute.*
- *University of the West Indies (St. Augustine).*
- *University of Trinidad and Tobago.*
- *Farming Community.*
- *Petroleum Industry.*
- *Construction Industry.*
- *Other Manufacturing Industries.*

The Notification Procedure would be as follows:

- *MEAU-MEWR decides to consider listing a chemical, requesting an exemption or continuing an exemption, either based on a suggestion from a government agency, industry stakeholder, research institute or private citizen; or on their own volition.*

- *Within one (1) month of a decision, the MEAU- MEWR assembles a position paper and circulates it to key stakeholders for comment. This position paper should provide, at minimum, the range of information required in Annex D (see Appendix D of this report).*

- *Stakeholders will be given three (3) months to comment on the position paper. This may be extended at the discretion of the MEAU- MEWR.*

- *The position paper will be amended based on responses from stakeholders and submitted to the Minister with responsibility for the Environment within six (6) months of the initial decision.*

After due consideration, the Minister with responsibility for the Environment, will either accept or reject the position paper. If the position paper is accepted, the Head of the MEAU of the Ministry will be instructed to forward the recommendation to the Stockholm Secretariat.

3.3.15.2 Statistical Data

As Mirex-S is the only POPs pesticide or chemical imported into the country, it will also be the only one reported to the Stockholm Secretariat. This reporting is the responsibility of the MEAU of the MEWR, and the statistics can be assembled from Customs Records. No additional resources would be required to assemble such reports.

3.3.16 Research, Development and Monitoring

Article 11 of the Stockholm Convention mandates Parties, within their capabilities to undertake research, development and monitoring at the national and international levels.

3.3.16.1 Research

Research efforts in Trinidad and Tobago will likely focus testing to determine levels of contamination by POPs. This will take the form of:

- Continuing research into contamination of plants and animals, such as the recent study to determine the presence of POPs in the tissue of fish [17]. Participants in the respective Workgroup at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) felt that this item should be viewed as a priority, but that areas to be investigated should be based on prior use of pesticides. They also felt that the investigations should explore inter-relatedness of human health and all pesticides (not just POPs Pesticides). They also supported the sequential approach of determining the presence of uPOPs and then testing for their presence in plant and animal tissue.

- Research into the use of substitute or modified materials, products and processes that will eliminate the production of uPOPs [7] at an estimated cost $TT 220,000 ($US 35,000).

- Sampling and testing to confirm potential sources of uPOPs releases (see Section 3.3.7).

- Sampling and testing to identify POPs-contaminated sites (see Section 3.3.11).

- Country-specific studies of human health effects of exposure to POPs and uPOPs (see Section 3.3.7.4).

3.3.16.2 Development

In the present situation in Trinidad and Tobago:

- The majority of POPs pesticides cannot be imported legally.

- Mirex-S is the only POPs pesticide presently in use, and the Ministry of Agriculture has indicated that there is a viable alternative.

- PCBs are being phased out, with new equipment containing non-PCB oils.

As such, it is considered unlikely that POPs research and development will be required.

3.3.16.3 Monitoring

Actions related to monitoring relate to:

- Laboratory Testing Capability.
- Self-Monitoring by Industries.

a) Laboratory Testing Capability

As noted in Section 2.2.5.1, there are six (6) POPs which are outside the testing capability of the local laboratories and the foreign laboratories with foreign with local agents.

The Monitoring and Assessment Capacity Report [15] of the study to develop a National Profile on Chemical and Waste Management in Trinidad and Tobago indicated steps that can be taken to close this gap in capability:

- The Environmental Laboratory of the Chemistry, Food and Drug Division presently can test for 13 POPs. This laboratory is not accredited, but there appear to be plans to merge this lab into the proposed National Public Health Laboratory. To expand their capability they would need technical training for their technical staff, as well as the purchase of two (2) Gas Chromatographs to be dedicated to this type of work. The estimated cost of purchasing new equipment and training to make this lab fully capable of POPs testing, plus accreditation under the TTLabs scheme is estimated at $TT 1.5 million ($US 238,000).

- CARIRI can test for six (6) POPs (in food and potable water). This laboratory indicated that they were accredited for POPs testing, but they did not indicate the accrediting agency. They did not indicate what would be required to expand their capability. Participants in the Workgroup on Technical Actions at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) felt that, subject to the availability of funding, CARIRI should also be upgraded with equipment and training.

- The Department of Chemistry at the University of the West Indies stated that they have all the instrumentation required to test for all POPs, but they would

need to purchase standards and conduct validation before they conducted such testing. This lab is not accredited. The cost of upgrading this laboratory for full POPs testing, including the cost of accreditation under the TTLabs scheme is estimated at $TT 583,000 ($US 93,000).

If the Government decides to develop a local testing capability for all POPs, it is considered likely that this will be done at the Environmental Laboratory of the CFDD or CARIRI. UWI is primarily a teaching institution, and there is some question whether they will be able to offer testing on an "on-call" or "as requested" basis.

b) Self-Monitoring by Industries

The Report on BAT/BEP to Minimize Releases of uPOPs [7] recommends a program to sensitize industries to the importance of self-monitoring for releases of POPs and uPOPs, whether or not such monitoring is mandated by CEC Conditions (see Section 2.2.4.5) or by requirements of the Water Pollution Rules (see Section 2.2.4.7) or the Air Pollution Rules (when enacted) (see Section 2.2.4.8). The report estimates the cost of such a program at $TT 95,000 ($US 15,000). If the program is extended beyond sensitization to training in self-monitoring, the cost is estimated at $TT 252,000 ($US 40,000). This action can be assigned to the MEAU of the MEWR, with assistance from the EMA.

3.3.17 Technical and Financial Assistance

The Report on BAT/BEP to Minimize Releases of uPOPs [7] lists a number of Technical Assistance activities aimed at the management of POPs and uPOPs. These pertain to:

- Best available Techniques (BAT) and Best Environmental Practices (BEP) for Industries.
- Management of Flaring.
- Other Technical Assistance.

3.3.17.1 Technical Assistance for Best Available Techniques (BAT) and Best Environmental Practices (BEP)

Participants in the Workgroup on Technical Actions at the Fourth National Workshop to Support the Implementation of the Stockholm Convention in Trinidad and Tobago held on 11th September 2013 (see Section 1.3) noted that the use of BAT/BEP has not been extensively mandated by regulatory agencies in the past, but that this was changing recently. This activity aims at providing assistance to industries and other stakeholders to determine the most appropriate methods for implementing BAT/BEP, with a view to minimizing or eliminating releases of POPs and uPOPs.

The Report on BAT/BEP to Minimize Releases of uPOPs [7] lists the following:

- Require new sources of uPOPs to adopt BAT/BEP under their Certificates of Environmental Clearance.

- Determine the most appropriate methods for implementing BAT/BEP for existing sources.

- Work with stakeholders to implement BAT/BEP to prevent the production and release of Annex C Chemicals.

- Identify concerns and determine and apply changes to laws, policies and public education campaigns as necessary in regard to the implementation of BAT/BEP at existing and new sources.

The Report on BAT/BEP to Minimize Releases of uPOPs [7] estimates the cost of this activity at $TT 189,000 ($US 30,000). The MEAU of the MEWR, the MEEA, the PTCI, the Trinidad and Tobago Bureau of Standards (TTBS) and the EMA can be involved in this technical assistance.

3.3.17.2 Technical Assistance for Flaring

The Report on BAT/BEP to Minimize Releases of uPOPs [7] recommends that this activity should:

- Build awareness and education of special interest groups (flare operators and Owners and relevant operators in the petroleum industry) on proper flare operation and production of uPOPs and their harmful effects.

- Promote among owners and operators of flare and seek their cooperation on establishing best operating practices, including better control and monitoring flare operations, the application of BAT/BEP to their operations, thereby reducing harmful emissions to the environment.

The report also recommends the development and implementation of an incentive programme to encourage compliance at flares. These actions are expected to run in parallel with, and to strengthen, on-going programs of the MEEA (see Section 2.2.4.9) to reduce the incidence of venting and flaring in the energy sector. The estimated cost of these two (2) activities is $TT 410,000 ($US 65,000). The MEAU of the MEWR and the MEEA can be involved in this technical assistance.

3.3.17.3 Other Technical Assistance

Other technical assistance would include:

- Providing farmers with information on alternatives to Mirex-S and burning of residue in the field (see Section 3.3.5.2).

- Provide farmers and other stakeholders with information on composting as an alternative to burning of selected types of organic waste (3.3.7.5).

Extension officers of the Ministry of Food Production can assist farmers with information listed above. The EMA can also provide information to farmers on these subjects.

3.3.17.4 Financial Assistance

Financing will be required for all of the studies listed in this NIP. The Report on BAT/BEP to Minimize Releases of uPOPs [7] also lists a number of areas in which Financial Assistance may be offered:

- Assist farmers with the purchase of an environmentally-friendly alternative to Mirex-S via the existing incentives program of the Ministry of Food Production (see Section 2.2.2.4).

- Provide financial incentives to industries for substituting materials or processes with a specific view to reducing the production or release of POPs or uPOPs to the environment. The estimated cost of designing such a program is $TT 126,000 ($US 20,000).

- Provide financial incentives to industries for implementing BAT and BEP with a specific view to reducing the production or release of POPs or uPOPs to the environment. The estimated cost of designing such a program is $TT 126,000 ($US 20,000).

- Provide financial incentives to industries for the purchase of equipment and the implementation of operational procedures for flares so as to minimize releases of POPs and uPOPs at an estimated cost of $TT 630,000 ($US 100,000).

3.4 Development and Capacity-building Proposals and Priorities

Three (3) items of capacity-building are envisaged under this NIP:

- Additional Staff at the EMA to administer the Waste Management Rules (see Section 3.3.1.3) at an estimated cost of $ TT 630,000 ($US 100,000) for a 3-year period).

- Additional Staff at the Pesticides and Toxic Chemicals Inspectorate.

- Developing Laboratory Testing Capability to cover all POPs (see Section 3.3.16.3).

- Training of a cadre of professionals in POPs Data-gathering and Management.

The MEWR still relies on the Ministry of Housing for support in areas such as Information Technology and Communications. There are several posts which are vacant within the Ministry, such as a Trade and Environment Specialist in the MEAU

and an Environmental Engineer in the Environmental Policy and Planning (EPP) Division. These vacancies are currently being addressed and once resolved, the MEWR would be capable of undertaking the necessary actions under the NIP. Additional staffing at the MEWR is therefore not listed as an action under this NIP.

3.4.1 Pesticides and Toxic Chemicals Inspectorate

As noted in Sections 2.3.3 to 2.3.3, the majority of pesticides and chemicals presently listed in the Annexes to the Stockholm convention have either been deregistered or were never registered by the PTCCB. The PTCI's mandate involves verification that such chemicals are not imported into the country and the deregistration of any new pesticides and chemicals that may be listed under the Stockholm Convention.

The PTCI's responsibilities extend beyond POPs and uPOPs, and include all pesticides and industrial chemicals used in the country. Its present complement of five (5) Inspectors is considered inadequate for regulating the increasing number of pesticides and chemicals for which registration is being sought. It will therefore be necessary to increase the number of inspectors by about ten (10) in the near future.

Given the time required to obtain approval for increases in staffing in the Public Service, consideration may be given to the use of United Nations Volunteers at the PTCI in the interim. Such Volunteers typically serve for a period of up to two (2) years, and can be used to supplement the staff of the Inspectorate in the short term; until new posts of Inspector are approved and filled.

3.4.2 Training in POPs Data-gathering and Management

The POPs Inventory Report [4] recommends training of selected personnel to conduct, update and report on the POPs Inventory. He notes that it is important to develop strategies at the institutional level to ensure continuity in data-gathering, management and sharing; particularly when persons who have received specialized training transition out of the position for which they have been trained. The POPs Inventory Report [4] envisages the following tasks as part of this activity:

- Develop Training Materials based on the UNEP Toolkit.
- Training in Identification of Stakeholders.
- Training in application of the Methodology to conduct POPs Inventory Surveys.
- Training in the use of the POPs Database.

It is envisaged that this training will be focussed primarily on the staff of the MEAU of the MEWR. The estimated cost of this activity is $TT 280,000 ($US 44,500).

3.5 Timetable for Plan Implementation and Measures of Success

Table 10 provides a timetable for implementing the actions recommended in this NIP, over the next five (5) years (2014 to 2018, inclusive). The estimated costs throughout this document and listed in the table below, represent average salaries and fees given by relevant agencies or organizations and were also based on the indicative costs associated with POPs management interventions as provided in the Report on Socio-Economic Considerations related to the Management of POPs in Trinidad and Tobago [6].

TABLE 10. KEY ACTIONS UNDER THE NIP

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
YEAR 1 (2014)			
1	Enact Local Enabling Legislation for the Stockholm Convention by enacting a new law or amending the Pesticides and Toxic Chemicals Act (see Section 3.3.1.1)	$10,000 MEAU of the MEWR	Law is enacted by Parliament and assented to by the President.
2	Amend the Negative List to include other POPs (see Section 3.3.1.2)	Not Quantified MTII	Cabinet approves the inclusion of other POPs, and a Legal Notice is issued.
3	Revise Customs Regulations based on the Amended Negative List (see Section 3.3.1.2)	Not Quantified Customs Division	Customs Regulations are revised.
4	Revise the Occupational Safety and Health Act (OSHA) to include uPOPs as agents causing occupational diseases (see Section 3.3.1.4)	$5,000 OSH Agency	Law is revised by Parliament and assented to by the President.
5	Enact the Beverage Containers Bill (see Section 3.3.1.4)	$20,000 Minister of the Environment and Water Resources	Law is enacted by Parliament and assented to by the President.
6	Prepare a 1-page Article on PCBs and publish in Newsletters of Industry Associations (see Section 3.3.4)	$10,000 MEAU of the MEWR	Article published in all target Newsletters.
7	Begin extension work relative to the phasing-out of Mirex-S (see Section 3.3.5.2)	No Separate Cost Ministry of Food Production	Feedback from Farmers.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
8	Design and implement a Health Screening program in at-risk communities to investigate the effects of exposure to uPOPs (see Section 3.3.7.5)	Depends on the Design of the Program Ministry of Health	Health Screening Program designed and ready for Implementation.
9	Review the present situation regarding Open Burning, and prepare Appropriate and Modern Guidelines to control Open Burning (see Section 3.3.7.6)	$45,000 MEAU of the MEWR	Review completed and Guidelines prepared.
10	Establish Database for Information Sharing with other Parties to the Convention (see Section 3.3.12.1)	No Separate Cost MEAU of the MEWR	Database available for use.
11	Institute a Campaign to make the Public aware of the NIP and the action items to be instituted (see Section 3.3.13.1)	$16,000 MEAU of the MEWR	Campaign successfully implemented and completed.
12	Develop Publicly-accessible on-line Database on Pesticides and Industrial Chemicals under the PTCI (see Section 3.3.13.2)	$8,000 PTCI	Database available for use.
13	Institute procedures to investigate chemicals to be listed or exempted under the Convention (see Section 3.3.15.1)	No Separate Cost MEAU of the MEWR	Procedure implemented.
14	Assemble data on Importation of Mirex-S, and report to the Secretariat (see Section 3.3.15.2)	No Separate Cost MEAU of the MEWR	Report submitted to the Secretariat.
15	Hire 10 additional Inspectors at the PTCI (see Section 3.4.1)	Not Quantified PTCCB and the Ministry of Health	New Inspectors Hired
16	Conduct Training on POPs Data-Gathering and Management (see Section 3.4.2)	$44,500 MEAU of the MEWR	Updated POPs Inventory.
YEAR 2 (2015)			
1	Within 6 weeks of the start of Year 2, prepare a Progress Update for Year 1 (see Section 3.3.14.1)	No Separate Cost MEAU of the MEWR	Report submitted to the Permanent Secretary of the MEWR.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
2	Enact the Waste Management Rules (see Section 3.3.1.3)	$5,000 EMA and Minister of the Environment and Water Resources	Notice of the Rule has been published in the Gazette and it is laid before Parliament.
3	Provide Staffing for a new Unit at the EMA to administer the Waste Management Rules (see Section 3.4)	$100,000 for first 3 years EMA	Staff hired and assigned.
4	Update the Water Pollution Rules to explicitly include POPs (see Section 3.3.1.4)	$5,000 EMA and the Minister of the Environment and Water Resources	Notice of the revised Rule has been published in the Gazette and it is laid before Parliament.
5	Work with the preparers of the National Solid Waste Strategic Plan to ensure that it specifically addresses the management of backyard burning of waste, alternatives to the burning of tyres and burning on the landfills (see Section 3.3.1.4)	$5,000 Ministry of the Environment and Water Resources and the Ministry of Local Government	Inclusion of the specified items in the Strategic Plan.
6	Survey of Power Companies and Large Industries relative to potential PCB Transformers and other electrical equipment (see Section 3.3.4)	$20,000 MEAU of the MEWR	Completion of the Survey, and Survey Report.
7	Update the POPs Inventory (see Section 3.3.7.1)	$85,000 MEAU of the MEWR	Updated POPs Inventory.
8	Monitoring of Air Quality at Pointe-a-Pierre for uPOPs (see Section 3.3.7.2)	$100,000 MEAU of the MEWR	Completion of the AQM Survey, and Survey Report.
9	Monitoring of Air Quality downwind of 3 Landfills in Trinidad (see Section 3.3.7.3)	$300,000 MEAU of the MEWR	Completion of the AQM Surveys, and Survey Reports.
10	Leachate Testing at 4 Landfills (see Section 3.3.7.4)	$127,000 MEAU of the MEWR	Completion of Leachate Sampling and Testing, and Report.
11	Continue the Health Screening program in at-risk communities to investigate the effects of exposure to uPOPs (see Section 3.3.7.5)	Depends on the Design of the Program Ministry of Health	Health Screening Program Implemented.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
12	Implement Awareness Programs for: • Farmers, on alternatives to open burning of agricultural residue (including composting), • Public, on alternatives to open burning of household garbage (including composting), and • Public, on steps to avoid accidental setting of bush and forest fires. (see Section 3.3.7.6)	$40,000 MEAU of the MEWR, Ministry of Food Production and the EMA	Awareness Program Implemented.
13	Develop a listing of sites that are potentially contaminated with POPs Pesticides (see Section 3.3.9)	$12,500 MEAU of the MEWR	Completion of Survey, and Listing of Sites.
14	Continue research into contamination of plants and animals (such as recent study into POPs in tissue of fish) (see Section 3.3.16.1)	Not Quantified MEAU of the MEWR and the PTCI	Research continued.
15	Develop in-country capability to test for POPs (see Section 3.3.16.3)	$238,000 Chemistry, Food and Drug Division or other.	Lab available for testing.
16	Sensitize Industries to importance of Self-Monitoring for POPs and uPOPs releases (see Section 3.3.16.3)	$15,000 MEAU of the MEWR, and the MEEA	Sensitization Program implemented
17	Determine most appropriate methods for Implementing BAT and BEP (see Section 3.3.17.1)	$30,000 MEAU of the MEWR, the MEEA, the PTCI, the TTBS and the EMA	Technical Assistance Program implemented.
18	Provide Technical Assistance to Flare Operators in the Energy Industry (see Section 3.3.17.2)	$65,000 MEAU of the MEWR, and the MEEA	Technical Assistance Program implemented.
19	Place an environmentally-friendly alternative to Mirex-S on the Incentives Program of the Ministry of Food Production (see Section 3.3.17.3)	Not Quantified MEAU of the MEWR, the Ministry of Food Production and the EMA	Alternative to Mirex-S placed on the Incentive Program.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
20	Design Financial Incentives to Industries for Substituting Materials or Processes to reduce releases of uPOPs (see Section 3.3.17.3)	$20,000 Ministry of Finance and MEAU of the MEWR	Financial Incentives Program Designed
21	Design Financial Incentives to Industries for implementing BAT and BEP to reduce releases of uPOPs (see Section 3.3.17.3)	$20,000 Ministry of Finance and MEAU of the MEWR	Financial Incentives Program Designed
22	Design Financial Incentives to Industries for Purchase of Equipment and implementing Operational Procedures at Flares to reduce releases of POPs and uPOPs (see Section 3.3.17.3)	$95,000 Ministry of Finance and MEAU of the MEWR	Financial Incentives Program Designed
YEAR 3 (2016)			
1	Within 6 weeks of the start of Year 3, prepare a Progress Update for Year 2 (see Section 3.3.14.1)	No Separate Cost MEAU of the MEWR	Report submitted to the Permanent Secretary of the MEWR.
2	Phase out Mirex-S (see Section 3.3.5.2)	No Separate Cost PTCCB	Mirex-S is deregistered.
3	Continue the Health Screening program in at-risk communities to investigate the effects of exposure to uPOPs (see Section 3.3.7.5)	Depends on the Design of the Program Ministry of Health	Health Screening Program Implemented.
4	Prepare Guidelines on the use of substitute or modified materials, products and processes (see Section 3.3.7.7).	$75,000 MEAU of the MEWR, the EMA and the Ministry of Food Production	Number of Stakeholders provided with information.
5	Testing at potentially PCB-contaminated sites (assumed 10 sites) (see Section 3.3.11.1)	$92,000 MEAU of the MEWR	Completion of sampling and testing, and Report.
6	Testing at sites potentially contaminated with POPs Pesticides (assume 10 sites) (see Section 3.3.1.2)	$143,000 MEAU of the MEWR	Completion of sampling and testing, and Report.
7	Limited Public Awareness Campaign (see Section 3.3.13.1)	$53,000 MEAU of the MEWR	Limited campaign implemented.
8	Continue Promoting the use of BAT/BEP (see Section 3.3.17.1)	Not Quantified MEAU of the MEWR and the EMA	Number of Farmers and Industries provided with information.

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
9	Continue Technical Assistance to Flare Operators in the Energy Industry (see Section 3.3.17.2)	Not Quantified MEAU of the MEWR, and the MEEA	Technical Assistance Program on-going.
10	Implement Technical Assistance to Farmers and other Stakeholders (see Section 3.3.17.3)	Not Quantified MEAU of the MEWR, the EMA and the Ministry of Food Production	Technical Assistance Program on-going.
11	Implement Financial Incentives to Farmers and Industries for replacing Mirex-S, substituting Materials and Processes, implementing BAT & BEP and improving Flare Operations (see Section 3.3.17.4)	Not Quantified Ministry of Finance	Financial Incentives Implemented.
YEARS 4 & 5 (2017 & 2018)			
1	Within 6 weeks of the start of Year 4, and again within 6 weeks of the start of Year 5, prepare Progress Update for Years 3 and 4, respectively (see Section 3.3.14.1)	No Separate Cost MEAU of the MEWR	Report submitted to the Permanent Secretary of the MEWR.
2	Within the first 3 months of Year 4, conduct an Audit of the NIP (see Section 3.3.14.2)	$32,000 MEAU of the MEWR	Audit Completed and Report Submitted.
3	Continue the Health Screening program in at-risk communities to investigate the effects of exposure to uPOPs (see Section 3.3.7.5)	Depends on the Design of the Program Ministry of Health	Health Screening Program Implemented.
4	Continue to promote the use of substitute or modified materials (see Section 3.3.7.5).	Not Quantified MEAU of the MEWR, the EMA and the Ministry of Food Production	Technical Assistance Program on-going
5	Remediate sites found to be PCB-contaminated (see Section 3.3.11.3)	Too early to quantify MEAU of the MEWR	Number of remediated sites.
6	Remediate sites found to be PCB-contaminated (see Section 3.3.11.3)	Too early to quantify MEAU of the MEWR	Number of remediated sites.
7	Continue to promote the use of BAT/BEP (see Section 3.3.17.1)	Not Quantified MEAU of the MEWR and the EMA	Technical Assistance Program on-going

No.	ACTION	ESTIMATED COST ($US) AND RESPONSIBLE AGENCY	MEASURE OF SUCCESS
8	Continue Technical Assistance to Flare Operators in the Energy Industry (see Section 3.3.17.2)	Not Quantified MEAU of the MEWR, and the MEEA	Technical Assistance Program on-going.
9	Continue Technical Assistance to Farmers and other Stakeholders (see Section 3.3.17.3)	Not Quantified MEAU of the MEWR, the EMA and the Ministry of Food Production	Technical Assistance Program on-going.
10	Continue Financial Incentives to Farmers and Industries for replacing Mirex-S, substituting Materials and Processes, implementing BAT & BEP and improving Flare Operations (see Section 3.3.17.4)	Not Quantified Ministry of Finance	Financial Incentives continue in place.
11	No later than 3 months after the end of Year 5, conduct an Audit of the NIP (see Section 3.3.14.2)	$32,000 MEAU of the MEWR	Audit Completed and Report Submitted.
ACTIONS THAT ARE OUTSIDE THE SCOPE OF THIS NIP			
1	Rationalization of the National Solid Waste System (see Section 3.3.8.2).	Not Quantified	Consolidated Landfill in Operation.
2	Institute a Hazardous Transport System for Trinidad and Tobago (see Section 3.3.10)	Not Quantified	System implemented.
3	MEEA's Program to Minimize Venting and Flaring in the Energy Industry	Not Quantified	Program fully implemented.

3.6 Resource Requirements

Resources required to implement this NIP are summarized in Table 11, along with an indication of the availability of such resources.

TABLE 11. RESOURCES AND AVAILABILITY

No.	RESOURCE	AVAILABILITY
1	Legal Drafting Capability	Such capability appears to be available locally and within the Region.
2	Laboratory Testing Capability	Full capability does not now exist. Recommendations for filling this gap are found in Section 3.3.16.3.
3	Capability to update the POPs Inventory	Basic capability appears to be available locally, but further training is suggested in Section 3.4.

No.	RESOURCE	AVAILABILITY
4	Capability to Sample and Test Leachate.	Sampling capability and some testing capability appears to be available locally. Some tests may have to be done abroad.
5	Capability to Sample Air and Test for uPOPs.	Basic sampling capability and some testing capability appears to be available locally. Some filters will have to be imported, and some tests may have to be done abroad.
6	Capability to conduct Investigations of suspected Contaminated Sites.	Such capability appears to be available locally.
7	Capability to conduct Public Awareness Campaign	Such capability appears to be available locally.
8	Additional Staffing for the EMA and the PTCI	There appear to be a number of graduates in Chemistry and related fields presently seeking employment.
		In addition, requests can be made for UN Volunteers as a short-term measure (up to 2 years) until posts can be established within the Public Service.

APPENDIX

ATTENDANCE AT THE FOURTH NATIONAL WORKSHOP TO SUPPORT THE IMPLEMENTATION OF THE STOCKHOLM CONVENTION ON POPs IN TRINIDAD AND TOBAGO
Capital Plaza, 11th September 2013

TABLE A-1: LIST OF ATTENDEES

NAME	ORGANIZATION
PARTICIPANTS	
Mr. Abrahim Ali	San Juan Business Association
Ms. Maria Allong	SWMCOL
Ms. Asha Babwah	Industrial Plants Services Limited
Ms. Jewel Batchasingh	MEAU
Mr. Karl Burgess	PCS Nitrogen
Ms. Asha Cardinal	South West Regional Health Authority
Ms. Gontalu Carillo	Repsol
Mrs. Terri-Anne Carter-La Fon	SWMCOL
Ms. Cezanne Chang	Occupational Safety and Health Agency
Ms. Xiomara Chin	Environmental Management Authority
Mr. Terrance Cournand	Pesticide and Toxic Chemicals Inspectorate, Ministry of Health
Ms. Kara Enightoola	Trinidad and Tobago Manufacturers'
Mr. Stephen French	SWMCOL
Mrs. Giselle Grannum-Modeste	Phoenix Park Gas Processors Ltd.
Ms. Moorlene Haywood	Ansa McAl Chemicals Ltd.
Ms. Rointra Hosein	Ministry of Energy and Energy Affairs
Ms. Sasha Jattansingh	The Cropper Foundation
Mr. Jared John	North West Regional Health Authority
Ms. Jonelle Jones	Basel Convention Regional Centre for the Caribbean
Ms. Karissa Koping	Trust for Sustainable Livelihoods
Mr. Mark Lawrence	Port of Spain Regional Corporation
Mr. Keith Le Blanc	Tunapuna/Piarco Regional Corporation
Ms. Cristina Legarza	Repsol
Ms. Abiola McCree	National Gas Company of Trinidad and Tobago Ltd.
Ms. Khaliqa Mohammed	Basel Convention Regional Centre for the Caribbean

NAME	ORGANIZATION
PARTICIPANTS	
Mrs. Shanta Nancoo-Ramsaroop	Ministry of Energy and Energy Affairs
Ms. Wendy Nelson	Institute of Marine Affairs
Mr. Sunil Ramlal	Petrotrin
Ms. Franchesca Roopchand	North West Regional Health Authority
Mr. Marc Rudder	Ministry of Energy and Energy Affairs
Ms. Linda Sawh	South West Regional Health Authority
Mr. Bryan Solomon	Tobago Regional Health Authority
Ms. Yashi Teelucksingh	Ministry of Energy and Energy Affairs
Mr. Ricky Sookoo	Eastern Regional Health Authority
Mr. Davlin Thomas	North Central Regional Health Authority
Mr. Richard Warren	SWMCOL
Mr. Mervyn Wilson	Sangre Grande Regional Corporation
RESOURCE PERSONS	
Mr. Kishan Kumarsingh	MEA Unit, MEWR
Ms. Rosemary Lall	UNDP
Dr. George Sammy	Consultant
Mr. Hans-Erich Schulz	UNDP
Ms. Mateela Scott	EPPD, MEWR
Ms. Nalini Sooklal	MEA Unit, MEWR
Ms. Tanya Staskiewicz	UNDP

TABLE A-2: WORK GROUPS

NAME	ORGANIZATION
Topic: Legislative Actions	
Ms. Cezanne Chang	Occupational Safety and Health Agency
Ms. Xiomara Chin	Environmental Management Authority
Mr. Glen Goddard	BPTT
Ms. Moorlene Haywood	Ansa McAl Chemicals Ltd.
Ms. Sasha Jattansingh	The Cropper Foundation
Topic: Technical Actions	
Ms. Maria Allong	SWMCOL
Mrs. Terri-Anne Carter-La Fon	SWMCOL
Ms. Jonelle Jones	Basel Convention Regional Centre for the Caribbean
Ms. Karissa Koping	Trust for Sustainable Livelihoods
Ms. Wendy Nelson	Institute of Marine Affairs
Topic: Awareness and Information	
Ms. Asha Cardinal	South West Regional Health Authority
Mr. Jared John	North West Regional Health Authority
Ms. Khaliqa Mohammed	Basel Convention Regional Centre for the Caribbean
Ms. Franchesca Roopchand	North West Regional Health Authority
Ms. Linda Sawh	South West Regional Health Authority
Topic: Assistance to Industries	
Ms. Asha Babwah	Industrial Plants Services Limited
Ms. Kara Enightoola	Trinidad and Tobago Manufacturers'
Mrs. Shanta Nancoo-Ramsaroop	Ministry of Energy and Energy Affairs
Mr. Sunil Ramlal	Petrotrin
Mr. Bryan Solomon	Tobago Regional Health Authority
Ms. Yashi Teelucksingh	Ministry of Energy and Energy Affairs
Topic: Assistance to Farmers, and Other Actions	
Mr. Karl Burgess	PCS Nitrogen
Mr. Stephen French	SWMCOL
Mr. Ricky Sookoo	Eastern Regional Health Authority
Mr. Mervyn Wilson	Sangre Grande Regional Corporation

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