

**The State of Qatar**

**Ministry of Environment**

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

**(POPs NIP)  
Qatar**

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## FOREWORD

The Stockholm Convention on Persistent Organic Pollutants (POPs) marks the global commitment to protect human health and the environment from POPs. Considered as another milestone in combating the adverse impacts of organic pollutants, the Convention calls for government commitment to take measures to eliminate or reduce the releases of these chemicals into the environment. Nations are obliged to establish national mechanisms to formulate and implement their own blueprint of actions for a sustainable healthy environment.

The State of Qatar takes the lead in being a supporter in protecting the environment and human health. We proudly embrace and humbly accept the Convention's challenges. We commit ourselves to the Conventions requirements not because we were asked **BUT** because our vision is to be a pioneer organization that maintains balance between preserving natural resources and the development requirements for better life in both present and future generations

The Government of the State of Qatar officially declared its commitment to the Convention when it ratified it in 2004. One of our foremost obligations, as a Party, is to develop a National Implementation Plan on Persistent Organic Pollutants (NIP). And we are proud to have this NIP which is a harvest of totally Qatari bloods with no support by any foreign or international organization.

A result of collaborative efforts among various governmental and non-governmental organizations, the NIP came to be a comprehensive document addressing multi-faceted issues relevant to POPs. Which made it stronger since it was the belief of the National Coordinating Team to have an environmentally clean atmosphere form their and future generations. It was created such that its activities are aligned with the National Government's short- and medium-term plans. It will serve as roadmap for future national undertakings pertaining to POPs and other chemicals of similar characteristics.

The NIP is our framework-addressing core issues in policy deployment for chemicals management in general and POPs in particular; providing short-term actions to build our capability to formulate, enforce, and monitor effective systems in protecting both health and environment. Undeniably, the tasks are intimidating. **BUT** with commitments from stakeholders, I accept as true we **CAN** do this. The ratification of the Convention signals for the commencement of our commitment while the National Implementation Plan embodies our intent in pursuing an environment worthy of our children.

Abdulla Bin Mubark Bin Aboud Al-Medadi  
**MINISTER OF ENVIRONMENT**

## SUMMARY AND CONCLUSIONS

Import and use of the pesticides listed in the Stockholm Convention (SC) on Persistent Organic Pollutants (POPs) have been banned in the State of Qatar since 1968. No inventory records on these chemicals have been found. However there is, a possibility of polychlorinated biphenyls (PCB) may exist in some old transformers which are still in use.

The unintentional production of polychlorinated dibenzo-*p*-dioxins (PCDD) and dibenzofurans (PCDF) is moderate due to the fact that the majority of the industry in Qatar is use only natural gas as their source of energy, there are no general waste incineration plants and only one plant producing chlorinated compounds. The release to the environment has been estimated to be of order of magnitude 16 g TEQ/year.

Knowledge on levels of these chemicals is limited in the environment and there are to date no legislations specifying acceptable limits.

Recommendations as detailed in the action plan have been focused on this latter point with emphasis on:

- Improve knowledge on existing and abandoned dump sites.
- Improve knowledge on levels of chemicals in the environment in general and in food chain in particular.
- Improve legislation. (updating legislation and improve its implementation)
- Establish a monitoring and reporting system in the Ministry of Environment (MoE) which should ensure that levels as set by the legislation are at least maintained.



## I. INTRODUCTION

### 1. Introduction

#### 1.1. Project

The Supreme Council for the Environment and Natural Reserves (MoE) was founded in the year 2000 by the Emiri decree No. 11/2000. This decree gave MoE the right to deal with all international Conventions concerning the environmental issues. In 10/12/2004 the state of Qatar ratified the SC and became a party member in 10/03/2005.

The main goal for this National Implementation Plan (NIP) is to inform both the public and the Conference of the Parties (COP) on how the requirements of the SC on Persistent Organic Pollutants (POPs) shall be implemented in Qatar. This report is written to fulfil Article 7 which states that each party must develop and endeavour to implement a plan for the implementation and submit it to the COP within two years following entry into force for it.

The Ministry of Environment's (MoE) strategy for implementation is based on the following Global Environments Facility's (GEF's) initial guidelines:

- 1- Primary evaluation of POPs and a preparation of a list of emissions and unintentionally produced POPs. Also determine how they are used and how they are disposed of in a safe way.
- 2- Train national institutions to determine POPs and how to deal with POPs in both practical and technical ways.
- 3- Submit a report to the COP.
- 4- Be able to specify available techniques and get support from COP to develop these.
- 5- Establish recommendation or requirements on acceptable, safe levels of POPs in Qatar.

#### 1.2. Project Objectives

To fulfil the above mentioned 5 points.

#### 1.3. Stockholm Convention

The objective of the Stockholm Convention is to protect human health and the environment from persistent organic pollutants (POPs). The Convention has initially identified twelve POPs components as follows:

- i. Pesticides (Aldrin, Chlordane, Dieldrin, DDT, Endrin, Heptachlor, Hexachlorobenzene, Mirex and Toxaphane)
- ii. Industrial chemicals (polychlorinated biphenyls (PCBs), and hexachlorobenzene (HCB) and mirex).
- iii. Unintentional by-products (Dioxins, furans, HCB and PCB).

The convention has entered into force on February 17, 2004. The POPs chemicals referred to in the Convention are listed in Annexes A, B, and C of the convention.

The requirements under the convention relating to the chemicals are stated in Article 3 (refers to the manufactured chemicals), Article 5 (refers to unintentionally produced by-products) and Article 6 (refers to stockpiles and wastes of all twelve POPs chemicals).

##### 1.3.1. Persistent Organic Pollutants

POPs are chemicals that are persistent, bio-accumulative, subject to long-range transport in the environment and causing adverse effects on human health or the environment. They are dangerous toxic substances because they do not break down easily in the environment and accumulate in living organisms. They are also a concern to human health because, of their propensity to accumulate over a lifetime and to be passed on from generation to generation, mainly through the placenta to the fetus and breast milk to the nursing infants. For more information about the POPs pesticides mentioned by the SC see Table 1.

### 1.3.2. Properties of POPs

**Persistence:** POPs are natural or man made organic compounds of a unique physical and chemical properties that once released into the environment remain intact for long periods of time because of their resistance to photolytic, chemical and biological degradations.

**Bioaccumulate:** They have low water solubility and high lipid solubility, which makes them soluble in fatty tissues of living organisms.

**Long-range transport:** They are semi-volatile compounds which makes them evaporate from their origin and transport over long distances in the atmosphere. They are also discharged directly or by atmospheric deposition into water and transported by the movement of water over long distances

**Adverse effects:** Since they bioaccumulate in organisms, they can trigger a range of generally subtle effects on human health, fish, wildlife and food chain.

### 1.3.3. Pesticides

There are nine pesticides listed in the SC, their names and specific uses are shown in Table 1.

### 1.3.4. Industrial Chemicals

**HCB:** Is used in the production of rubber, aluminium munitions and dyes and in wood preservation and other manufacturing.

**Mirex:** This chemical is used as a fire retardant in plastics, rubber and electrical goods.

**PCBs:** These compounds are employed in industry as heat exchange aids, in electric transformers and capacitors and as additives in paint, carbonless copy paper, sealant and plastics. Heptachlor has also been used more widely to kill cotton insects.

### 1.3.5. Unintentionally Produced POPs (UPOPs)

**Dioxins:** These chemicals can be produced unintentionally due to incomplete combustion, as well as during the manufacture of certain pesticides and other chemicals. In addition, certain kinds of metal recycling and pulp and paper bleaching can release dioxins. Dioxins have also been found in automobile exhaust, tobacco smoke and when burning wood and coal.

**Furans:** Are unintentionally produced compounds from the same processes that release dioxins. They are also found in commercial mixtures of PCBs.

**HCB:** Is a by-product of the manufacture of such as cotton and grains. It is also used to control mice, voles and other rodents. It is an industrial chemical and is released as a result of certain combustion processes.

**PCBs:** Are released as unintentional by-products both from industrial processes and from combustion.

**Table 1. POPs Pesticides and Their Uses**

<b>Name of pesticide</b>	<b>Specific uses</b>
<b>Aldrin</b>	Used to control soil insects <i>e.g.</i> termites, corn rootworm, wireworms, rice water weevil, grasshoppers etc.
<b>Chlordane</b>	A broad-spectrum insecticide used on a range of different agricultural crops and also to control termites.
<b>Dieldrin</b>	Mainly used to control termites and textile pests, also to control insect-borne diseases and insects living in agricultural soils.
<b>Endrin</b>	Used for leaves and field crops such as cotton, jute and grains as insecticides. It is also used to control mice, voles and other rodents.
<b>Heptachlor</b>	Used against soil and cotton insects, grasshoppers, crop pests and termites.
<b>Mirex</b>	Used against ants and to control leaf cutters, harvester termites, mealy bug etc. It has also been used as a fire retardant in plastics, rubber, paint paper and electrical goods.
<b>Toxaphene</b>	First and foremost it is used to control cereal grains, fruits, nuts vegetables and cotton. It has also been used to control ticks and mites in livestock.
<b>DDT</b>	An insecticide which is intensively used for vector control in malaria eradication program. It was used during the second world war to protect the soldiers and civilians from malaria, typhus and other diseases spread by insects, and is still used in many countries against mosquitoes.
<b>Hexachlorobenzene (HCB)</b>	A widely used pesticide and fungicide for seed treatment. It is also produced as an unintentional by-product in chemical industries and is present as an impurity and in combustion process too.

## **II**

### **COUNTRY PROFILE**

## 2. Country Profile

### 2.1. Location and Climate Characteristics

Qatar is located between latitude 24'27 and 26'10 North and Longitude 50'45 and 51'40 East and so it is halfway along the western coast of the Arabian Gulf. The Country is a peninsula extending towards the north of the Gulf with a set of small islands. The length of the peninsula from south to extreme north is about 160 Km., and the total area including the islands is about 11493 sq. Km. The State of Qatar is administratively divided into ten municipalities including Doha which is the capital and commercial centre of the country. It is located midway along the Qatar's eastern coast and has a modern airport and important commercial port. Mesaieed is the second important city is located in the Southern Eastern coast and is about (36) km south of Doha. It is a modern industrial city and has two main ports; one is commercial and the other is for oil exportation (Ref. 1).

Qatar, officially State of Qatar, is an independent emirate, has mostly barren areas and is bordering Saudi Arabia and the United Arab Emirates. It is characterized by flat landscape except for some small hills and high ground to the North West. There are no high areas in Qatar except few scattered sandstone and limestone hills. The highest peak is about 100 m., the areas of vegetation are in the north, while the south is arid, covered by sand and salt flats.

The climate is characterized by a hot summer starting from June till middle of September. Winter is warm, with little rainfall. It starts from December till the end of February. The weather is generally pleasant during January till April and October till December.



Figure 1. Map of the State of Qatar

## 2.2. Population

The population in Qatar in 2004 was 744029 and is presently increasing at a rate of 9% per year. The majority (more the 80%) of population occupies just 10% of the land area. The distribution of population has primarily been confined to the areas with a developed infrastructure in addition to coastal areas and along major transport routes (Ref. 1).

**Table 2. Distribution of Population over the Different Municipalities**

Municipality	March 2004	
	Number	%
Doha	339847	45.7
Al Rayyan	272860	36.7
Al Wakra	31441	4.2
Umm Slal	31605	4.2
Al Khor	31547	4.2
Al Shamal	4915	0.7
Al Ghuwairiya	2159	0.3
Al Jemailiya	10303	1.4
Jaryan Al batna	6678	0.9
Mesaieed	12674	1.7

## 2.3. Industrial Investment

In Qatar, although the oil sector continues to dominate all economic activities, there have been efforts and policies by the government towards setting up several heavy and light industries to diversify the source of national income and complete the industrial infrastructure. The government has set up industrial estates supplied with all essential facilities and utilities. The main industrial estates are shown below:

**2.3.1 Mesaieed Industrial City:** The major heavy industrial city in the country. Examples of some of the most important industries in this city are steel, petrochemicals, liquefied gas, chemical fertilizers and oil refineries. There are two ports serves this city one is a commercial port and the other serves the industry.

**2.3.2. Salwa Industrial Area:** Located 7 Km. west of Doha and is the main centre for medium and light industries, workshops and trading establishments.

**2.3.3. Ras Laffan Industrial City:** A newly developed industrial estate spreads over an area of 40 sq. Km. It is developed to house a great number of complexes and facilities of gas related industries and services such as processing, liquefaction and exportation of gas, petrochemicals and refining of condensates.

**2.3.4. Umm Bab Industrial Area:** This the centre for cement plants together with smaller oil and gas separation plants.

**2.3.5. Dukhan industrial Area:** Oil and gas was first found in this area and is treated in a number of separation plants before being piped to Mesaieed.

Apart from these, other small industrial areas include El Karaanah (sand washing), Neijah (compost fertilizer) and Umm Al Afaai (quarries).

## **2.4. Economic Sector**

Qatar has one of the largest proven reserves of natural gas and this is the main basis for the industry in the country. The economy is among the fastest growing in the world.

Qatar has, in only a few decades, developed into a major supplier of energy and will soon be the largest exporter of Liquefied Natural Gas (LNG), in the world and a leader in the production of liquid fuels from the gas.

While developing the hydrocarbon based industry, emphasis has also been placed on the supporting industries in order to have a balanced industrial sector in the country.

## **2.5. Chemical Management**

The state of Qatar being conscious of the large number of chemicals required for its development, particularly those related to the oil, gas and petrochemicals industries, passed law No. 30 of the year 2002 covering safeguards and requirements for the protection of the environment and including article No. 26 dealing direct of chemical management such as importation, handling, storage and transportation.

The major function in the management of toxic chemicals relates to regulating their import. The users of these chemicals are required to justify their import and show that non-toxic substitutes are not available. Another part of the work relates to the transport and storage of these chemicals within the State.

Since Qatar is a desert country, this makes the use of pesticides limited. And in 1967 a poisoning of flour contaminated with endirin lead to the death of 50 citizens. This incidence forced the government to stop importing and using this compound and other chlorinated pesticides. Accordingly a specific committee has been established to collect information on all similar pesticides, which lead to a list of all known chlorinated pesticides at that time. A decree (10, 1968) was issued listing the prohibition of importing and usage of these pesticides among which were POPs.

The results from the POPs pesticides inventory team showed that there are neither stockpiles nor contaminated sites.

### **2.5.1. Chemicals**

MoE has streamlined much of the activities related to importing chemicals. These include the following:

- a- An inter-departmental Committee has been set up by MoE for controlling imports and proper management of hazardous chemicals. The Committee would look into five specific areas as follows:
  - 1. Registration of imported chemicals
  - 2. Transportation
  - 3. Storage
  - 4. Handling
  - 5. Disposal
- b- The requirements to be fulfilled by the importer were derived from the United Nations (UN) and International Maritime Organization.
- c- Industries importing chemicals are required to fill in a standardized application form for each; toxicity data, country of origin and storage facilities are some of the relevant information sought.
- d- Explicit rules related to the transportation of hazardous chemicals have been laid-out.
- e- Consumption patterns by the industry and its safety record are checked before issuing new import permits.
- f- Special regulations were prepared for importing and transporting radioactive materials.

MoE has founded a chemical data-base for all imported chemicals to Qatar contain the following information:

- a- Identify importer and their facilities.

- b- Trade name, chemical name and its Chemical Abstract Substance (CAS) number.
- c- Quantity and packing type.
- d- Purpose of usage and method of disposal.
- e- Hazard and toxicity level as given in Material Safety Data Sheet (MSDS).
- f- Exporter and distributor.

### **2.5.2. Pesticides**

A policy on pesticides has been established as follows:

- a- Highly toxic pesticides that affect animals and human are banned.
- b- Persistent pesticides are banned.
- c- Pesticides are applied under close supervision.
- d- Pesticides are applied at the right time to counter specific diseases.
- f- The application during flowering and ripening are banned.

In addition to the above, as required by the United Nations Environment Programme (UNEP); documents covering the status of POPs and toxic substances in Qatar are under preparation.

Special efforts are made with respect to pesticide imports, these are:

- a- Importers must have valid license, proper storage facilities and trained technical staff.
- b- All pesticides are to be registered and their registration to be renewed each year.
- c- Highly toxic or carcinogenic pesticides are banned or severely restricted in their use.
- d- All importers, transporters and workers must have adequate awareness and knowledge.
- e- The disposal of expired pesticides is totally controlled and empty containers are disposed under supervision.

### **2.5.3. Legislations and Regulations Addressing POPs**

Legislations dealing with chemicals in general and pesticides mentioned as POPs in particular do exist under Law No. (10) for the year 1968 and Law No. (30) for the year 2002, these cover:

- a- Highly toxic pesticides, which may affect animals and human are avoided.
- b- Persistent pesticides which may affect animals and humans are avoided.
- c- Pesticides are applied under close supervision.
- d- Pesticides are applied at the right time to counter the disease.
- e- The application during flowering and ripening are avoided.
- f- Workers are given periodical medical examination which cover liver function and cholesterol enzyme levels.



### **III**

#### **STRATEGIES AND ELEMENTS OF THE ACTION PLAN FOR NIP**

### **3. General**

The preparation of the NIP report was based on inventories made by three individual teams:

- a- Pesticides
- b- PCBs
- c- Dioxins and furans

Details from each group are given below.

#### **3.1. Pesticides**

##### **3.1.1. Aims of the pesticides team**

- a- Enumerate an inventory for the pesticides listed as POPs.
- b- Present a report based on the inventory results to the National Coordination Steering Committee (NCSC).

##### **3.1.2. Methodology**

To reach the intended outcomes from the inventory, the following steps were adopted:

- a- Design questionnaires for the targeted parties involved with POPs pesticides (Appendix 1)
- b- Specify the targeted parties involved and their locations. The parties involved in using and importing pesticides were specified.
- c- Prepare an inventory questionnaire (Appendix 1)
- d- Review of reports concerning pesticides in Qatar. Studies, scientific reference and reports had been collected in cooperation with ministries and government authorities which prepared periodical report about pesticides.
- e- Review of records on pesticides in Qatar. The records of the Ministry of Municipal Affairs and Agriculture, data base of the MoE were reviewed and analyzed (Ref. 2).
- f- Collection of legislations on pesticides in Qatar
- g- Compile related international Conventions.

##### **3.1.3. Outcomes**

###### **3.1.3.1. Review the Inventory Records of the Parties Involved with Pesticides**

The inventory records of the parties targeted in the study were reviewed, and it revealed that they were free from pesticides included in SC.

###### **3.1.3.2. Specifying the Targeted Parties**

The targeted parties were divided into two main groups in accordance to their performed as follows:

- a- Importers
- b- Users

###### **3.1.3.2.1. Pesticides Importers**

The companies were categorized on the basis of records from The Ministry of Economy and Commerce (MBT), and their establishment date considering that the POPs pesticides were prohibited from importing since the beginning of the eighties. It is worth mentioning that the Chemicals Department at MoE (Ref. 2) is the only authorized department in State of Qatar to approve the entry of any pesticide or chemical in the country, in cooperation with the Preventive Health Department (PHD) at Hammad Medical Corporation (HMC).

###### **3.1.3.2.2. Pesticides Users**

These parties were divided into three different categories i.e. governmental organizations, private companies and farms based on the nature of their services and needs.

### **3.1.3.2.3. Government Organizations**

All governmental organizations which might have dealt or still deal with pesticides were specified based on the results of the questionnaire (Appendix 1).

### **3.1.3.2.4. Private Companies**

There are 47 registered private companies in State of Qatar that imports pesticides through tenders announced by official governmental departments. These were identified basically from the information received from the MBT.

### **3.1.4. Preparation of the Questionnaire**

A questionnaire was designed to get all the requested information from each party was prepared (Appendix 1). The method used to collect information from importing companies depended totally on the data from the data base in MoE and from Customs and Ports General Authority (CPGA).

### **3.1.5. Conventions Related to the SC on POPs**

1. The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (03/07/1995).
2. Rotterdam Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade (08/11/2004).

### **3.1.6. Analysis of Results**

The analyses of the periodically issued reports from departments dealing with pesticides in Qatar showed that the State of Qatar is neither using nor storing any of the POPs pesticides mentioned in SC.

### **3.1.7. Recommendations**

- Public awareness:
  - Publish educational pamphlets.
  - Advertise in media.
  - Hold workshops and lectures in Universities and Schools.
  - Competitions for various targeted groups.
- Sampling and analysis program:
  - Establish background levels in general and in existing and abandoned dump sites.
- Review existing legislations to ensure that acceptable levels of the pesticides are specified.

## **3.2. Dioxins and furans**

### **3.2.1. Introduction**

Possible sources of dioxins and furans in Qatar are limited to relatively few industries and institutions, and a questionnaire (Appendix 2) was distributed in order to gather information which, together with statistical information and data from the “Toolkit” (Ref. 3), has been used to assess the total releases.

Results showed that the petrochemical plant which produces vinyl chloride is the only plant in Qatar that routinely report to MoE on regular basis the emissions and effluents of dioxins and furans. No other routine analysis is known to NCSC.

### **3.2.2. Executive Summary**

The unintentional production of dioxins and furans in Qatar is small and has been estimated to be of the order of magnitude 9 g/year of which only 10 g are being released into air or sea. The information about the levels of contamination in the local environment is on the other hand almost non-existent and only a few regular analyses are being done.

Detailed recommendations for an analytical program, improvements in the legislation and information to the concerned parties are given in the report.

### 3.2.3. Sources of PCDD and PCDF in Qatar

The industry in Qatar which may release PCDD and PCDF into the environment is almost entirely based on oil and gas as raw material. Electrical energy and water supply are similarly generated from gas fired plants.

With its desert climate, there are *e.g.* no forests and also a very limited supply of wood for burning; the NCSC has excluded, among other sectors, possible contributions from wildfires but included burning of biomass represented by the wood and charcoal used for barbecuing using the available import statistics.

Based on a thorough evaluation of the complete list of categories in the; “Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases” (Ref. 3) , only the categories which are relevant for Qatar, and which are listed in table 3, have been selected for inclusion in the base line study. The selection has been done using the expertise of the NCSC members and the information on the industry, institutions and other possible emission categories existing in MoE.

The complete list from the “Toolkit” is presented in Appendix 3 with comments related to relevance or no relevance for Qatar summarizes how the information has been collected.

In addition to the calculated, estimated emissions there is one production plant for vinyl chloride where the chlorinated residues are incinerated under controlled conditions and emissions are analyzed and reported. Solid residues from this plant are treated as hazardous waste and are temporarily stored in containers in the site before final treatment in the central facility for Qatar which is under construction. The total annual contribution from this plant has been calculated based on the actual analyses and is reported as such.

With the limited number of actual analyses available, the baseline study results rely in principle entirely on the approximate values for PCDD and PCDF emission factors as given in the Toolkit. The values used are presented in the section below.

**Table 3. Relevant Dioxin/Furan source Categories in Qatar**

Category	Reference number in Toolkit
waste incineration plants	6.1
steel industry including galvanizing	6.2.3
production of electric power and water	6.3.1
biomass (wood, charcoal)	6.3.4
cement industry	6.4.1
Transportation	6.5.1/6.5.3
oil and gas industry	6.7.2/6.7.3
Tobacco	6.8.5

#### 3.2.3.1. Emission Factors

The emission factors used for the estimation of the annual releases of the PCDD and PCDF are all taken from the Toolkit (Ref. 3) and are shown in the following table:

**Table 4. Emission Factors for PCDD and PCDF**

Source	Unit	Air emission factor in $\mu\text{g TEQ/unit}$	Residue emission factor in $\mu\text{g TEQ/unit}$	Comments
Other incineration of hazardous waste	t	10	450	Controlled combustion, good air pollution control system
Iron and steel production plants	t	0.1	1.5	Clean scrap/virgin iron in electric arc furnace
Fossil fuel power plants	t	0.025	-	Value for natural gas feed. Corresponds to $0.5 \mu\text{g /Tj}$
Gas fired boilers, crackers etc	t	0.025	-	Only natural gas
Cement production	t	0.05	0.003	Based on flue gas temperatures above $300^\circ\text{C}$
Transport, 4-stroke engines	t	0.1	-	Based on unleaded fuel and no catalyst
Transport, diesel engines	t	0.1	-	
Flares	t	0.4	-	Corresponds to $8\mu\text{g /Tj}$
Tobacco	t	0.125	-	Converted from $0.1 \text{ pg/cigarette}$ and assuming $0.8\text{g/cigarette}$
Biomass (charcoal) burning	t	30	1000 (per kg ash residue)	Value for contaminated wood as all charcoal is assumed to be used for barbecuing
Hot dip galvanizing	t	0.06	-	

### 3.2.4. Unintentional Production According to Source

In the following paragraphs, the contributions from the different sectors of industry and institutions are presented based on the information provided and the emission factors given in 3, note that only rounded figures have been used.

#### 3.2.4.1. Waste Incineration, General

A limited number of incinerators exist, most of them designed and operated for a specific purpose within an industrial area. To date, no incinerators exist for domestic waste. The incineration of medical waste from hospitals was discontinued in 1999, and the present system is based on the Autoclave system.

##### 3.2.4.1.1. General Incinerators

###### 3.2.4.1.1.1. Air emissions

**Table 5. Emissions to Air Incineration**

Plant	Waste incinerated in t/year	Estimated TEQ in g/year
<b>Total</b>	147	0.0015

### 3.2.4.1.1.2. Solid waste

**Table 6. Solid Waste Incineration**

Plant	Solid waste in t/year	Estimated TEQ in waste in g/year
<b>Total</b>	2	0.0009

### 3.2.4.1.1.3. Dedicated incinerators

**Table 7. Incinerators in Oil and Gas Sector**

Plant	Incinerator capacity in t/year	Est. or calc. TEQ in g/year in flue gas	Est. or calc. TEQ in g/year in residue
<b>Total</b>	57038	0.48	0.083

### 3.2.4.2. Metal Production

#### 3.2.4.2.1. Steel

There is only one steel plant in Qatar and the amount of steel galvanized per year was estimated on the basis of the import statistics of zinc and assuming a zinc/steel ratio of 0.035 (data from the galvanizing industry) (Ref. 2).

#### 3.2.4.2.1.1. Emissions to Air

**Table 8. Emissions to Air Steel Production**

Plant	Production in t/year	TEQ emissions in g/year
Steel production	1,152.000	0.1150
Hot dip galvanizing	80.000	0.0048
<b>Total</b>	<b>1,232.000</b>	<b>0.1200</b>

#### 3.2.4.2.1.2. Solid Waste

**Table 9. Solid Waste Metal Production**

Plant	TEQ in waste in g/year	Comments
Steel production	1.728	Based on steel production
Hot dip galvanizing	-	Data not available

### 3.2.4.3. Power Generation

Power is generated in dedicated power stations by Qatar Electricity and Water Co, (QEWCo). The power generated by the different industries for their own use is included in the figures from these industries/sectors. Only emissions to air are considered to contribute to the emission studies.

#### 3.2.4.3.1. Emissions to Air

**Table 10. Emissions to Air from Power Generation**

Plant	Consumption of natural gas in t/year	TEQ emissions in g/year
<b>Total</b>	<b>8,806.000</b>	<b>0.22</b>

### 3.2.4.4. Household Heating and Cooking with Biomass

The only available data on the use of biomass is from the import of charcoal and wood (which is assumed to be used for barbecuing). This value has been used together with the emission factor for contaminated biomass.

**Table 11. Emissions from Biomass**

Type of fuel	Use in t/year	Estimated emission to air of TEQ in g/year	Comment
Charcoal	25,500	0.765	No estimate has been done on residues

### 3.2.4.5. Cement Production

The cement production is concentrated in Umm Bab on the western coast of Qatar.

**Table 12. Cement Production**

Plant	Location	Gas Fired Units	Incinerator	Liquid Effluent	Solid Waste
<b>Total</b>	Umm Bab	Yes	no	no	no

#### 3.2.4.5.1. Emissions to Air

**Table 13. Emissions to Air and Residue Cement Production**

Plant	Production in t/year	TEQ emissions in g/year to Air	TEQ emissions in g/year (Residue)
<b>Total</b>	870,000	0.044	0.003

### 3.2.4.6. Transportation Sector

Emissions from the transportation sector have been estimated based on the consumption of fuel supplied by the refinery. All fuel sold in Qatar is now unleaded and the emission factor for unleaded gasoline without catalyst has been used in order to use a conservative figure.

The number of two-stroke engines in Qatar is small compared to the number of 4-stroke and diesel engines and most of them are used only for recreational purposes.

Even if the emission factor is 25 times higher than for the 4-stroke engines, the estimated additional contribution is probably within the accuracy of the total estimated value of 1.2 g/year. This is based on the assumption that all cars sold in recent years are equipped with catalyst - and thus have zero emission - and that less than 1% of the gasoline is used in 2-stroke engines.

**Table 14. Emissions to Air by Transportation sector**

Type of fuel	Annual sale in 2005 in t	Estimated TEQ in g/year	Comments
Gasoline	5.893.000	0.59	Value based on unleaded fuel and no catalyst
Diesel	6.128.000	0.61	
<b>Total</b>	<b>12,021.000</b>	<b>1.2</b>	<b>Accuracy +0/-0.2</b>

### 3.2.4.7. Oil and Gas Sector

The sources of emissions to the atmosphere in the oil, gas and petrochemical industries are from direct fired units, from incinerators and, in some cases, also in the effluent to the sea and as solid waste.

All direct fired units are operated on natural gas and are therefore, treated as one source. Local power generation is included in the figures for the different industries.

### 3.2.4.7.1. Emissions to Air from Gas Fired Units

**Table 15. Emissions to Air from Gas Fired Units in the Oil and Gas Sector**

Plant	Consumption of natural gas in t/year	Flaring in t/year	TEQ emissions in g/year
<b>Total</b>	<b>19,329,231</b>	<b>1,217.000</b>	<b>0.345</b>

It should be noted that the “No-Flare” Program; which was initiated by the Ministry of Energy and Industry (MEI) which is now being implemented by the industry, will eventually reduce and eliminate all continuous flaring. Flares will continue to exist, but only for use during upsets and in emergencies.

### 3.2.4.7.2. Emissions to Water

**Table 16. Emissions to Water in the Oil and Gas Sector**

Plant	Effluent in m3/hour	Analysis in ngTEQ/m <sup>3</sup>	TEQ in effluent in g/year
<b>Total</b>	<b>9</b>	<b>6.5</b>	<b>0.0005</b>

### 3.2.4.7.3. Solid Waste

**Table 17. Solid Waste from Oil and Gas Sector**

Plant	Solid waste in t/year	Analysis in ngTEQ/kg	TEQ in waste in g/year
<b>Total</b>	<b>75</b>	<b>4320</b>	<b>4.0015</b>

### 3.2.4.8. Tobacco

The contribution from tobacco has been calculated from import statistics. The total import has been assumed to be as cigarettes since that is the only information available for emissions is based on cigarette smoking.

**Table 18. Emissions Tobacco Smoking**

Source	Annual import of tobacco and tobacco containing products in t	Estimated air emissions of TEQ in g/year	Comments
Tobacco	1801	0.0002	see comments in table 4

### 3.2.5. Dump Sites and Other Areas of Concern; Hot Spots

Very little information exists on existing or abandoned dump sites or sites where ground flares, which might be a source of ground contamination, have been or still are in operation.

Some PCB analyses exist from the waste water ponds which are still in use, but the analyses have not included dioxins or furans. (Ref 4)

In order to establish values for possible contamination of these sites, the sites have to be registered, classified and then analyzed. This will be part of the recommended actions.

### 3.2.6. Analyses of Emissions and Effluents

Analysis of effluents, solid residues and flue gases are only submitted to the MoE on a regular basis by one company. Sampling and analysis are done according to recognized standards and the results are summarized in the Table 19.

The only area of concern is the solid, spent catalyst residue which contains very high values of dioxins and furans. This particular residue is stored in a dedicated area on site and will be disposed of to the national waste treatment centre which is anticipated to commence operation in 2006.



**Table 19. Emissions Calculated from Actual Analyses**

Waste stream	Analysis	Annual release in g TEQ/year	Comments
Flue gas from dedicated incinerator	0.013-0.06 ng/Nm <sup>3</sup>	0.001-0.005	
Water from biological wastewater plant	0-9.5 pg/l	0- 0.0006	
Dry sludge from biological wastewater plant	320 ng/kg	0.001-0.0015	Controlled storage on site
Spent catalyst	40-57 ng/g	2.5-4	Controlled storage on site

**3.2.7. Other Areas**

Other areas that contribute to the production of PCDD/PCDF do exist, but no available data is there to assess the quantities. Two examples demonstrate that, for one, the contribution is not significant and for the other that more data is needed these are:

- a- Asphalt mixing may emit up to 0.2 g/year based on one continuously working plant with a capacity of 2 million tons/year.
- b- Residues from the dry cleaning operators are not known and no calculations can therefore be made

**3.2.8. Summary**

Individual figures, all in g TEQ/year, and which have been presented in this report are summarized in table 7.1 below.

**Table 20. Summary of PCDD and PCDF Formation in g TEQ/year**

Category	Emissions to the air	To waste water	In solid waste	Toolkit category
Incineration	0.4820		0.083	6.1
Metals production	0.1200		1.728	6.2.3
Power generation	0.2200			6.3.1
Biomass burning	0.7650			6.3.4
Cement production	0.044			6.4.1
Asphalt mixing				6.4.6
Transportation	1.2000			6.5.1/6.5.3
Oil and gas industry	0.3450	<0.0006	4.002	6.7.2/6.7.3
Tobacco	0.0002			6.8.5
<b>Total</b>	<b>3.1762</b>	<b>&lt;0.0006</b>	<b>5.813</b>	

### **3.2.9. Discussion**

The estimated and measured amounts of dioxins and furans released to the environment in Qatar compared to more industrialized nations are moderate. There are, however, areas where more information needed to be collected in order to verify the estimates.

The previous practice of using ground pits for flaring from oil and gas wells may have left contamination in the soil surrounding the pits; this has to be investigated further to get a better understanding of the situation.

Except for the releases from the transportation sector, the releases to the environment are concentrated in the industrial areas of Ras Laffan, Mesaieed, Dukhan and Umm Bab. The use of natural gas for virtually all power and heat generation is the main reason for the small amount of dioxins and furans being released from this activity; the continuation of this practice will ensure that the emissions will remain low.

### **3.2.10. Recommendations**

Recognizing the following:

- That relatively moderate amounts of dioxins and furans are being released.
- Taking into account the limited knowledge about the actual levels of contamination in the State of Qatar.
- Based on the information gathered during the preparation of the baseline study and the knowledge about the effects on human life of the dioxins and furans.

The NCSC recommends the program listed under 3.2.10.1 and 3.2.10.2 to be implemented without undue delay. The analytical and the awareness programs can be initiated immediately without excessive cost. The legislation will necessarily include specific requirements on both the public and the private sectors and will therefore require more time and consultation with the concerned parties.

#### **3.2.10.1. Analytical Program**

An analytical program should be initiated in order to establish the level of dioxins and furans or confirm the absence of such in:

- Soil in areas where there have been ground flares.
- Soil and groundwater of abandoned and existing dump sites.
- Fish from local waters.
- Poultry raised in Qatar.
- Milk from breast-feeding mothers.
- Local sheep and camels.

The results from the program should be used as input to possible specific clean-up actions and the legislation and information program following the recommendations in 3.2.10.2 and 3.2.10.3.

#### **3.2.10.2. Legislation**

Existing legislation should be enforced and new legislation prepared to

- Minimize flaring and, depending on the results from the analytical program in 3.2.10.1, impose a total ban on ground flares/pit burning.
- Include regular dioxin and furans analysis from all incinerators operating in Qatar.
- Control waste collection, treatment and disposal (*e.g.* dry cleaning residues).
- Ensure that all hazardous waste generated in Qatar can be disposed of locally in an environmentally safe way thus eliminating transportation to other countries.
- Include requirements to assess levels of dioxins and furans in the EIA for new plants/plant sites.
- Establish recommendations or requirements on safe levels of dioxins and furans.

### **3.2.10.3. Information**

Information and awareness programs should be developed for industry, hospitals, the waste management sector and relevant governmental institutions on:

- how to prevent the formation of dioxins and furans
- how to deal with contaminated sites or waste
- how to follow up the levels of dioxins and furans in foodstuff
- which measures should be taken if recommended levels are exceeded

### **3.2.11. Review of “Toolkit” Categories with Relevance to Qatar**

See Appendix 3.

## **3.3. PCBs**

### **3.3.1. Introduction**

Polychlorinated biphenyls are a group of manufactured organic chemicals that contain 209 individual congeners. Concentrated PCBs are either oily liquids or solids and are colorless to light yellow in color with no odour.

The main physical properties of PCBs is that they have low volatility and low dielectric constant they are highly resistance with a very low water solubility, but high solubility in organic solvents. They are non biodegradable, persistent in the environment and accumulate in fatty tissues of living organisms.

PCBs do not burn easily and because of their good insulating properties, they have been widely used as coolants and lubricant in electrical transformers and other electrical equipments.

With few exceptions, PCBs were manufactured as a complex mixture of congeners, through progressive chlorination of batches of biphenyl until a certain target percentage of chlorine by weight was achieved. Commercial mixtures with higher percentages of chlorine contained higher proportions of the more heavily chlorinated congeners, but all congeners could be expected to be present at some level in all mixtures. Once released into the environment and subjected to "weathering", or taken in by plants or animals and partially stored/metabolized/excreted, substantial changes in the congener ratios occurred, and continue to occur.

### **3.3.2. Scope**

In accordance to the information received from the Qatar General Electricity and Water Corporation (KAHRAMAA), the number of transformers distributed in Qatar is (8722). We have chosen the year 1985 as a base line year for the PCB inventory in Qatar.

An inventory team has been established in coordination and collaboration with KAHRAMAA and training has been given to this team on the following points:

- how to fill the inventory form (Appendix No.4)
- how to description of any contamination
- how to collect samples and what safety measures should be taken to avoid additional contamination

### **3.3.3. Inventory Results**

Inventory results showed that there are 2958 transformers which were manufactured in 1985 and before. Thirty three samples representing 52 transformers were taken and analyzed locally at the Central Laboratory in MoE. Results showed that there are 27 PCB containing transformers and 20 contaminated sites with PCBs.

### **3.3.4. Recommendations**

1- Replace all PCB containing transformers according to a plan between MoE and KAHRAMAA.

2- Clean up all contaminated sites.

3- Assign a site with specific conditions as a store for either PCB containing transformers or contaminated material.

#### **4. Strategy and Action Plan Elements of the National Implementation Plan**

##### **4.1. Policy Statement**

Being aware of the toxic properties of POPs and their bioaccumulation, transportation through air and water, and migratory species and their resistance to degradation and recognizing their effects on human beings and the environment. The State of Qatar has eliminated the use of POPs pesticides since 1968. The NIP and the action plan will therefore, focus on minimizing the known PCDD/PCDF sources and the eliminating PCBs containing devices. This can be done by following the action plans.

##### **4.2. Implementation Strategy**

###### **4.2.1. Introduction**

Based on the results of the preliminary study, the NCSC identified the following problems and difficulties associated with the management and control of PCDD/PCDF emissions in Qatar and basic information on the actual present levels of the POPs chemicals:

- 1- Insufficient information and data of contamination of PCDD/PCDF, at the national level.
- 2- Minute coordination between institutions and no central databank for data related to contamination of hazardous compounds.
- 3- Insufficient legislation that tackle the POPs issue in general and PCDD/PCDF and PCBs in particular.
- 4- Lack of analyzing and monitoring infrastructure.
- 5- Low public awareness on the effects of POPs on health and environment.
- 6- Gaps in the education system.

###### **4.2.2. Criteria and Priority Areas**

According to the inventory results, which clarified the situation of POPs in Qatar, the NCSC has proposed the following areas to be prioritized.

- 1- Establish actual levels of the POPs contaminants in the environment. Priority should be given to abandoned dump sites and ground flare areas to see the effect of previous activities. Actual levels in locally produced foodstuffs and milk from breastfeeding mothers should be included in the survey.
- 2- Fill the gaps in the legal system with respect to POPs in general and PCDD/PCDF and PCBs in particular, *i.e.* legally establishing acceptable levels of the contaminants and introduce actions to be taken if the levels are exceeded.
- 3- Strengthen the existing institutional system and the capacity building.
- 4- Raise awareness among all target groups.
- 5- Strengthen the existing educational system.
- 6- Promote improved technologies and practices for new industries.
- 7- Mobilize financial resources.
- 8- Establish a general monitoring system for the POPs contaminants and ensure that the data are readily available to all concerned parties in a central data bank.

In detail:

###### **1- Establish actual levels of contaminants (PCDD, PCDF and PCBs)**

It has to be recognized that little emphasis was given to pollutants in the early days of the oil and gas exploration in Qatar. Knowledge on what was used and dumped is limited and there are a number of sites which might be contaminated. In addition the levels in locally produced foodstuffs and the population should be analyzed.

- List and evaluate all dumpsites and location of ground flares.

- Sample and analyze soil from the selected sites.
  - Sample and analyze locally produced meat and fish from local waters.
  - Sample and analyze milk from breastfeeding mothers.
  - Sample and analyze drinking water in Qatar.
  - Establish a monitoring program.
- 2- Fill the gaps in the legal system in respect of POPs in general and PCDD/PCDF and PCBs in particular**
- a- Review all existing legislations aiming to establish acceptable levels of the relevant POPs chemicals in products foodstuff and the environment.
  - b- Update the existing legislations in order to empower the environmental authorities to be able to react when levels are exceeded.
  - c- Develop new legislation to ensure that the acceptable levels are maintained or reduced.
- 3- Strengthen the existing institutional system and the capacity building**
- a- Identify and assess the needs for improving hazardous waste management
  - b- Provide training for all relevant institutions and parties.
- 4- Raise awareness among all target groups and population**
- Develop and design awareness programs for all relevant target groups (decision makers, institutions, Non-governmental Organizations (NGO), industries, communities).
- 5- Improve educational system at all levels**
- a- Introduce issues of chemicals management and chemical safety to the disciplines of the curriculum of the universities and schools.
  - b- Initiate research and studies on the distribution and accumulation patterns in Qatar.
- 6- Promoting improved technologies and practices**
- Promote BAT and BET techniques.
- 7- Mobilizing financial resources.**
- Ensure the financing of the programs listed.
- 8- Establish a general monitoring system for the POPs contaminants and ensure that the data are readily available to all concerned parties in a central data bank**

#### **4.3. Activities, Strategies and Action Plans**

This chapter describes the activities, strategies and action plans in consistence with the UNEP guidelines. The time period to fulfill the NIP and its action plans is 15 years (from 2007-2022). The tables below give more elaboration on the tasks carried out by the responsible and concerned ministry or institution, estimated costs and the period.

##### **4.3.1. Activity 1: Institutional and Regulatory Strengthening Measures**

This activity is consistent with the Stockholm Convention, article (5), a, ii: an evaluation of the efficacy of the laws and policies of the party relating to the management of such releases.

**Table 21. Institutional and Regulatory Strengthening Measures**

Description	Tasks	Responsibility	Estimated Costs US \$	Time Frame
<b>Action 1.1: Adaptation of existing legislation so as to address POPs issues</b>				
Review and update existing legislation	1. Update the Environment Protection Law No. (30) for the year (2002) and it's bylaw	MoE	98,630	2007-2009
<b>Action 1.2: Improvement of the mechanisms and measures for POPs control</b>				
Develop mechanisms to improve the enforcement of legislation	2. Creation of a new sampling program for POPs in general and PCDD/PCDF and PCBs in particular	MoE	100,000	2007-2011

**4.3.2. Activity 2: Measures to Reduce or Eliminate Releases from Intentional Production and Use**

**4.3.2.1. Compliance and Objectives under SC**

According to the Convention, article 3, Qatar has to prohibit and eliminate the production, use, import and export of chemicals listed in Annex A and the production and use of chemicals listed in annex B. In addition to this Qatar has to take measures to protect the environment and human health by reducing the releases of these chemicals.

**4.3.2.2. Background Information and Findings**

As it has been mentioned before, Qatar has already stopped the use of chemicals listed in annexes A and B (POPs pesticides) since 1968 and with regard to PCBs (annex A) Qatar also stopped the use of this substance since 1992. The replacement of the PCBs containing devices started in Qatar since 1992, but there are still some transformers containing PCBs as mentioned above.

As a first step, 33 samples were taken from 52 transformers from different locations and analyzed. The analyses results showed that 27 samples were contaminated with PCBs.

**Table 22: Activity 2: Measures to Reduce or Eliminate Releases from Intentional Production and Use**

Description	Tasks	Responsibility	Estimated Costs US \$	Time Frame
<b>Action 2.1: Carry out a comprehensive inspection of remaining transformers</b>				
Not all transformers manufactured in 1985 and before were tested for PCBs and not all sites were visited	3. All transformers manufactured in 1985 and before and their sites should be inventoried in order to investigate	MoE and KAHRAMAA	60,000	2009-2022

**4.3.3. Activity 3: Production, Import and Export, Use, Stockpiles and Wastes of Annex A POPs Pesticides (Annex A, Part I Chemicals)**

Since, Qatar does not produce any POPs pesticides; the inventory results showed that there are neither stockpiles nor pesticides waste exists. Some old dump sites might contain POPs pesticides which were deposited in past. It is recommended to establish a monitoring programme that includes sampling and analyzing requirements. Activity 4.3.16: Research, Development and Monitoring will cover this activity.

#### **4.3.4. Activity 4: Production, Import and Export, Use, Identification, Labelling, Removal Storage and Disposal of PCBs (Annex A, Part II Chemicals)**

##### **4.3.4.1. Compliance and Objectives under SC**

According to Article 6 of the convention, Qatar shall develop appropriate strategies for identifying products and articles in use that contain PCBs and wastes consisting of, containing or contaminated with PCB are managed in a manner protective of human health and the environment.

It also recommends that each party should take appropriate measures so that wastes, including products and articles upon becoming wastes, are:

- (i) Handled, collected, transported and stored in an environmentally sound manner;
- (ii) Disposed of in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants or otherwise disposed of in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option or the persistent organic pollutant content is low, taking into account international rules, standards, and guidelines, and relevant global and regional regimes governing the management of hazardous wastes;
- (iii) Not permitted to be subjected to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of persistent organic pollutants; and
- (iv) Not transported across international boundaries without taking into account relevant international rules, standards and guidelines.

##### **4.3.4.2. Background Information and Finding**

Activity 4.3.2 showed that Qatar will carry out a comprehensive inspection to identify all sources of PCBs either as used devices or contaminated sites. Removal, storage and disposal methods will then be implemented.

**Table 23: Activity 4: Measures to Reduce or Eliminate Releases from Intentional Production and Use**

Description	Tasks	Responsibility	Estimated Costs US \$	Time-Frame
<b>Action 4.1: Prepare a comprehensive inspection plan for PCBs sources in Qatar</b>				
All sites will be visited in order to determine PCBs containing transformers and contaminated sites	4. Samples from all transformers manufactured in 1985 and before should be analyzed	MoE and KAHRAMAA	15,000	2009-2011
	5. Samples from contaminated sites should be analyzed	MoE and KAHRAMAA	15,000	2009-2011
<b>Action 4.2: Develop and implement a plan to phase out PCBs containing transformers and to dispose of PCBs contaminated transformers</b>				
All transformers in Qatar come under the responsibility of KAHRAMAA	6. Develop a plan to replace and eliminate contaminated transformers	MoE and KAHRAMAA	Depends on results	2011
	7. Allocate fund to implement the plan	KAHRAMAA	Depends on results	2011-2012
	8. Assign a site with safety requirement to store the replaced transformers.	MoE and KAHRAMAA	200,000	2012
	9. Replace contaminated transformers	MoE and KAHRAMAA	Depends on result and the market	2011-2022
	10. Dispose of PCBs contaminated transformers according to international regulation and treaties.	MoE and KAHRAMAA	Depends on result and the market	2020-2022

**4.3.5. Activity 5: Production, Import and Export, Use, Stockpiles and Wastes of DDT (Annex B chemicals) if Used in the Country**

Qatar does not produce, use, import or export DDT since 1968, and there are no stockpiles or wastes of these chemicals in the country. Therefore, Qatar does not need to develop any action plan for DDT.

**4.3.6. Activity 6: Register for Specific Exemptions and the Continuing Need for Exemptions**

Qatar does not need to register for any exemptions and accordingly Qatar has not developed an action plan for this purpose.

**4.3.7. Activity 7: Measures to Reduce Releases from Unintentional Production**

**4.3.7.1. Compliance and Objectives under SC**

Article 5 of the convention states that each party shall at minimum take measures to reduce the total releases derived from anthropogenic sources of each of the chemicals listed in Annex C Accordingly, Qatar should:

- a- Develop and implement an action plan to identify and address the releases of these chemicals;
- b- Creating mechanisms to apply the action plan;



#### 4.3.7.2. Background Information and Findings

In Qatar as it has been shown, that there are only a limited number of activities that release PCDD/PCDF into the environment. The monitoring system has to take this into account and the action plan will therefore focus more on the sampling and analysing issues in order to keep these lower concentrations of PCDD/PCDF as they are while ensuring that possible past emissions will be known and measures taken wherever necessary.

**Table 24. Measures to Reduce Releases from Unintentional Production**

Description	Tasks	Responsibility	Estimated Costs US \$	Time Frame
<b>Action 7.1: Promote BAT/BEP Techniques</b>				
Unintentional emission can occur mainly from six activities: 1. Waste Incineration; 2. Ferrous and Non-Ferrous Metal Production; 3. Power Production; 4. Production of Mineral Products; 5. Transport; 6. Uncontrolled Combustion Processes	11. Emphasize on the existing monitoring system and create a new one whenever required	MoE and Industries	1,098,961,476	2007-2022
	12. Apply updated technologies and practices in order to reduce PCDD/PCDF emissions in Qatar.			

#### 4.3.8. Activity 8: Measures to Reduce Releases from Stockpiles and Wastes

##### 4.3.8.1. Compliance and Objectives under SC

Referring to Article 6 of the Convention Qatar has to identify waste sites contaminated with chemicals listed in Annex C of the convention and manage them in an environmentally sound management.

##### 4.3.8.2. Background Information and Findings

There is only one site contains waste contaminated with chemicals listed in Annex C of the convention. The waste is stored in specific locked containers and is under controlled, and monitored by the MoE and QVC. It has been mentioned that this waste will be treated in the central facility for Qatar which is under construction.

#### 4.3.9. Activity 9: Facilitating or Undertaking Information Exchange and Stakeholder Involvement

##### 4.3.9.1. Objective and Compliance under SC

Articles 9, 1, a and b of the convention states that each party shall facilitate or undertake the exchange of information relevant to:

- a- The reduction or elimination of the production, use and release of the persistent organic pollutants; and
- b- Alternatives to persistent organic pollutants, including information relating to their risks as well as to their economic and social costs.

The activity is aiming to:

- a- Strengthen communication among all relevant stakeholders;
- b- Distributing information and data to all institutions and public;
- c- Encourage NGOs to be involved in the POPs issue.

**Table 25. Facilitating or Undertaking Information Exchange and Stakeholder Involvement**

Description	Tasks	Responsibility	Estimated Costs US \$	Time Frame
<b>Action 9.1: Exchange of information with the secretariat of the SC.</b>				
All POPs-related information and data are existing only at the MoE (POPs inventory reports and others)	13. Submit information and data to the secretariat of SC	MoE	6,000	2007
<b>Action 9.2: Creation database for POPs</b>				
Chemical database in MoE needs updating and to be accessible by all	14. Creation of a database that can be accessed by all stakeholders and the public.	MoE	1,983,288	2007-2009
<b>Action 9.3: Exchange information on POPs</b>				
Encourage collection and exchange of data. Avoid multiple data acquisition.	15. List all institutions that are concerned with POPs information sources.	MoE	50,000	2007-2010
	16. Design a system to facilitate data collection and exchange.			

#### 4.3.10. Activity 10: Public Awareness, Information and Education

##### 4.3.10.1. Objectives and Compliance under SC

According to article 10 of the SC,

- 1- Each party shall, within its capabilities promote and facilitate:
  - a- Awareness among its policy and decision makers with regard to persistent organic pollutants.
  - b- Provision to the public of all available information on POPs.
  - c- Development and implementation, especially for women and children and the least educated, of educational and public awareness programmes on POPs as well as on their health and environmental effects and on their alternatives.
  - d- Public participation in addressing POPs and their health and environmental effects and in developing adequate responses including opportunities for providing input at the national level regarding implementation of this convention.
  - e- Training of workers, scientists, educators and technical and managerial personnel.
  - f- Development and exchange of educational and public awareness materials at national and international levels.
  - g- Development and implementation of education and training programmes at national and international levels.

- 2- Each party shall, within its capabilities, ensure that the public has access to the public information referred to in paragraph 1 and that the information is kept-up-to-date.
- 3- Each party shall, within its capabilities, encourage industry and professional users to promote and facilitate the provision of the information referred to in paragraph 1 at the national level and, as appropriate, sub-regional, regional and global levels.
- 4- In providing information on POPs and their alternatives, parties may use safety data sheets, reports, mass media and other means of communication, and establish information centres at national and regional levels.
- 5- Each party shall give sympathetic consideration to developing mechanisms, such as pollutant release and transfer registers, for the collection and dissemination of information on estimates of the annual quantities of the chemicals listed in Annex A, B and C that are released or disposed of.

**Table 26. Public Awareness, Information and Education**

Description	Tasks	Responsibility	Estimated Costs US \$	Time Frame
<b>Action 10.1: Design Awareness training Programs for all target groups</b>				
Awareness and training programmes have to include all available information and data on POPs and should be fit for all target groups according to their levels of education and knowledge.	17. Introduce POPs issues in the discipline in the curricula for graduate and undergraduate institutes	MoE, Universities and SEC	40,000	2007-2012
	18. Conducting workshops and training courses for municipalities and Industries as required based on the outcome of the monitoring and analyses program.			
	19. Design awareness materials for the public.	MoE, MoH and SCFA	10,000	2007 - 2022
	20. Use media to raise awareness concerning POPs in general and PCDD/PCDF and PCBs in particular.	MoE, MCH	60,000	2007 - 2022

**4.3.11. Activity 11: Effectiveness Evaluation**

This activity is consistent with article 16 of the SC:

**Table 27. Effectiveness Evaluation**

Description	Tasks	Responsibility	Estimated Costs US \$	Time Frame
<b>Action 11.1: Develop a monitoring programme to evaluate the effectiveness of the planned actions</b>				
This program shall serve to evaluate the progress done, identify the gaps to fill them in the future and find the positive points to strengthen them.	21. Update inventory process periodically based on the ongoing analyses and sampling program.	MoE	50,000	Once every 5 years
	22. Update the NIP.		25,000	
	23. Evaluate every single activity and task based on the current situation and the progress achieved.	MoE	50,000	Every two years
	24. Evaluate awareness and educational programmes by developing indicators that help to determine the progress made.	MoE	2,000	2007- 2022

**4.3.12. Activity 12: Reporting**

**4.3.12.1. Objectives and Compliance under SC**

According to article 15 of the convention, the objective of this activity is to report to the COP and the Secretariat of the convention on:

1. Measures that were taken to implement the provisions of the SC and on the effectiveness of such measures in meeting the objectives of the SC;
2. Statistical data on the total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such data and a list of states from which the country has imported each such substance and states to which it has imported each such substance.

**Table 28. Reporting**

<b>Description</b>	<b>Tasks</b>	<b>Responsibility</b>	<b>Estimated Costs US \$</b>	<b>Time Frame</b>
<b>Action 12.1: Designing a data collection system for PCDD/PCDF emissions from every source</b>				
Report nationally to evaluate the efficiency of measures taken to reduce the PCDD/PCDF emissions.	25. Submit annual reports on the use of BAT/BEP techniques and the difficulties faced.	MoE and Industries	1,500	Annually starting from 2008
Report the progress made to the COP with respect to the implementation of the SC requirements.	26. data and information collection	MoE	1,500	
	27. Submit report on the effectiveness of the adopted measures.			

**4.3.13. Activity 13: Research, Development and Monitoring**

**4.3.13.1. Objectives and compliance under SC**

Article 11 of the SC states that:

1. The parties shall, within their capabilities, at the national and international levels, encourage and/or undertake appropriate research, development, monitoring and cooperation pertaining to persistent organic pollutants and, where relevant, to their alternatives and to candidate persistent organic pollutants, including on their:
  - a- Sources and releases into the environment
  - b- Presence, levels and trends in humans and the environment
  - c- Environmental transport, fate and transformation
  - d- Effects on human health and the environment
  - e- Socio-economic and cultural impacts
  - f- Release reduction and/or elimination
  - g- Harmonized methodologies for making inventories of generating sources and analytical techniques for the measurements of releases.
2. In undertaking action under paragraph 1, the parties shall, within their capabilities:
  - a- Support and further develop, as appropriate, international programmes, networks and organizations aimed at defining, conducting, assessing and financing research, data collection and monitoring, taking into account the need to minimize the duplication of efforts;
  - b- Support national and international efforts to strengthen national scientific and technical research capabilities, particularly in developing countries and countries with economies in transition, and to promote access to, and the exchange of, data and analyses;
  - c- Take into account the concerns and needs, particularly, in the field of financial and technical resources, of developing countries and countries with economies in transition and cooperate in improving their capability to participate in the efforts referred to in subparagraphs (a) and (b);
  - d- Undertake research work geared towards alleviating the effects of persistent organic pollutants on reproductive health;
  - e- Make the results of their research, development and monitoring activities referred to in this paragraph accessible to the public on a timely and regular bases; and
  - f- Encourage and/or undertake cooperation with regard to storage and maintenance of information generated from research, development and monitoring.

**Table 29. Research, Development and Monitoring**

Description	Tasks	Responsibility	Estimated Costs US \$	Time-Frame
<b>Action 13.1: Conduct Researches and Studies on the Effects of POPs on Environment and Human being</b>				
environmental Research and studies should be part of the research plans in different universities and research institutes	28. conduct studies on blood samples, Milk from breast feeding mothers, air and drinking water, marine environment, soil	MoE, Universities, Industries and Health	To be assigned later	Annually starting from 2008

#### 4.3.14. Activity 14: Technical and Financial Assistance

Because of the financial capability that Qatar has, Qatar will allocate any financial needs so as to execute all actions contained in this plan. With regard to technical aspect, Qatar might require some kind of technical assistance.

##### 4.3.14.1. Objectives and Compliance under SC

This activity falls under the requirement of articles 12 and 13 of the SC.

**Table 30. Technical and Financial Assistance**

Description	Tasks	Responsibility	Estimated Costs US \$	Time Frame
<b>Action 14.1: Allocation of requisite funds for the NIP</b>				
Funds will be available according to the needs.	29. Allocate local funds for the implementation of the NIP and its activities.	MoE	To be summed later	Annually starting in 2008

#### 4.4. Development and Capacity Building Proposals and Priorities

The requirement for the implementation of the NIP and its activities has shown that there are some gaps that would need to be filled. One of the most important one is the **capacity building**. Other gaps are described in the following points:

- 1. Propose and develop mechanisms to improve inter-ministerial communication and coordination.** The coordination and the collaboration between the line ministries and institutions concerned with chemical management are weak. Therefore we need to develop mechanisms to improve communication among all these line ministries and institutions such as: MoE, MMUP, MoH, CMC, MEI, private sectors, petroleum and gas companies and NGOs.
- 2. Improve Data Collection and Monitoring of POPs emissions and releases.** Connect all databases in the country
- 3. Review and improve the legislation system.** Eliminate all interventions and overlapping in the existing legislations (laws, by-laws and regulations) in particular those dealing with chemicals and chemicals management. We have also to develop new legislation that deal with POPs issue in general, PCDD/PCDF, and PCBs in particular. Beside these activities, we need to improve and develop mechanism for the implementation of the legislations in Qatar.

## 5. Timetable for plan Implementation and Measures of Success

**Table 31. Timetable for plan Implementation and Measures of Success**

Action	Implementation Year															
	Short- term				Medium-term					Long-term						
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>Activity 1: Institutional and Regulatory Strengthening Measures</b>																
Action 1.1	1	1	1													
Action 1.2	2	2	2	2	2											
<b>Activity 2: Measures to Reduce or Eliminate Releases from Intentional Production and Use</b>																
Action 2.1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
<b>Activity 3: Production, Import and Export, Use, Stockpiles and Wastes of Annex A POPs Pesticides (Annex A, Part I Chemicals)</b>																
<b>Activity 4: Measures to Reduce or Eliminate Releases from Intentional Production and Use</b>																
Action 4.1			4, 5	4, 5	4, 5											
Action 4.2					6, 7, 9	7, 8, 9	9	9	9	9	9	9	9	9, 10	9, 10	9
<b>Activity 5: Production, Import and Export, Use, Stockpiles and Wastes of DDT (Annex B chemicals) if Used in the Country</b>																
<b>Activity 6: Register for Specific Exemptions and the Continuing Need for Exemptions</b>																
<b>Action Plan 7: Measures to Reduce Releases from Unintentional Production</b>																
Action 7.1	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12
<b>Activity 8: Measures to Reduce Releases from Stockpiles and Wastes</b>																

Action	Implementation Year															
	Short- term				Medium-term					Long-term						
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>Activity 9: Facilitating or Undertaking Information Exchange and Stakeholder Involvement</b>																
Action 9.1	13															
Action 9.2	14	14	14													
Action 9.3	15, 16	15, 16	15, 16	15, 16												
<b>Activity 10: Public Awareness, Information and Education</b>																
Action 10.1	17, 18, 19, 20	17, 18, 19, 20	17, 18, 19, 20	17, 18, 19, 20	17, 18, 19, 20	17, 18, 19, 20										
<b>Activity 11: Effectiveness Evaluation</b>																
Action 11.1	24	23, 24	24	23, 24	24	21, 22, 23, 24	24	23, 24	24	23, 24	21, 22, 24	23, 24	24	23, 24		21, 22, 23, 24
<b>Activity 12: Reporting</b>																
Action 12.1		25	25	25	25	25	25	25	25	25	25	25	25	25	25	25



Action	Implementation Year															
	Short- term				Medium-term					Long-term						
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>Activity 13: Research, Development and Monitoring</b>																
Action 13.1		28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
<b>Activity 14: Technical and Financial Assistance</b>																
Action 14.1		29	29	29	29	29	29	29	29	29	29	29	29	29	29	29

## **6. Resource Requirement**

Funds have been assessed According to the individual activities and strategies planned in this document. The total amount required is (1,101,783,394 US\$). The MoE can provide this amount through the Ministry of Finance according to the existing national rules.

\*1,098,961,476 is the budget submitted by Um Saeed waste management Centre for the general cleaning project

**Table 32. Resource Requirement**

<b>Activity/Strategy</b>	<b>Tasks No.</b>	<b>Total fund required US \$</b>
<b>Activity 1: Institutional and Regulatory Strengthening Measures</b>		
Action 1.1	1	98,630
Action 1.2	2	100,000
<b>Activity 2: Measures to Reduce or Eliminate Releases from Intentional Production and Use</b>		
Action 2.1	3	120,000
<b>Activity 3: Production, Import and Export, Use, Stockpiles and Wastes of Annex A POPs Pesticides (Annex A, Part I Chemicals)</b>		
<b>Activity 4: Measures to Reduce or Eliminate Releases from Intentional Production and Use</b>		
Action 4.1	4	15,000
	5	15,000
Action 4.2	6	Depends on results
	7	Depends on results
	8	200,000
	9	Depends on results and market
	10	Depends on results and market
<b>Activity 5: Production, Import and Export, Use, Stockpiles and Wastes of DDT (Annex B chemicals) if Used in the Country</b>		
<b>Activity 6: Register for Specific Exemptions and the Continuing Need for Exemptions</b>		
<b>Activity 7: Measures to Reduce Releases from Unintentional Production</b>		
Action 7.1	11	1,098,961,476
	12	
<b>Activity 8: Measures to Reduce Releases from Stockpiles and Wastes</b>		
<b>Activity 9: Facilitating or Undertaking Information Exchange and Stakeholder Involvement</b>		
Action 9.1	13	60,000
Action 9.2	14	1,983,288
Action 9.3	15	50,000
	16	
<b>Activity 10: Public Awareness, Information and Education</b>		
Action 10.1	17	40,000
	18	
	19	10,000
	20	60,000
<b>Activity 11: Effectiveness Evaluation</b>		
Action 11.1	21	50,000
	22	25,000
	23	50,000
	24	2,000
<b>Activity 12: Reporting</b>		
Action 12.1	25	1,500
	26	1,500
	27	
<b>Activity 13: Research, Development and Monitoring</b>		
Action 13.1	28	≈100,000
<b>Activity 14: Technical and Financial Assistance</b>		
Action 14.1	29	≈35,804,630

## GLOSSARY

**BAT:** Best Available Technique  
**BEP:** Best Environmental Practice  
**CAS:** Chemical Abstract Substance (number)  
**COP:** Conference of Parties  
**CPGA:** Customs and Ports General Authority  
**DDT:** 1,1,1-trichloro-2,2 bis(4-chlorophenyl) ethane  
**g:** Gram  
**GEF:** Global Environmental Facility  
**HCB:** Hexachlorobenzene  
**Km.:** Kilo meter  
**LNG:** Liquefied Natural Gas  
**µg:** Microgram,  $10^{-6}$  gram  
**m:** Meter  
**MEI:** Ministry of Energy and Industry  
**MSDS:** Material Safety Data Sheet  
**MBT:** Ministry of Business and Trade  
**MMUP:** Ministry of municipal Affairs and Urban Planning  
**MCH:** Ministry of Culture and Heritage  
**MH:** Ministry of Health  
**NCSC:** National Coordination Steering Committee  
**Ny'g:** Nanogram,  $10^{-9}$  gram  
**NGO:** Non-governmental Organizations  
**NIP:** National Implementation Plan  
**Nm<sup>3</sup>:** Normal cubic meter  
**PCBs:** Polychlorinated biphenyl  
**PCDD:** Polychlorinated dibenzo-*p*-dioxin  
**PCDF:** Polychlorinated dibenzofuran  
**pg:** Picogram,  $10^{-12}$  gram  
**PHD:** Prevent Health Department  
**POP:** Persistent Organic Pollutants  
**KAHRAMAA**  
**KAHRAMAA:** Qatar General Electricity and water Corporation  
**QU:** Qatar University  
**QVC:** Qatar Vinyl Company  
**SC:** Stockholm Convention on Persistent Organic Pollutants  
**MoE:** Ministry of environment  
**SCFA:** Supreme Council for Family Affairs  
**SEC:** Supreme Education Council  
**Sq. Km:** Squared kilo meter  
**t:** Ton  
**TEQ:** Toxic equivalent  
**Tj:** Terajoule  
**UN:** United Nations  
**UNEP:** United Nations Environment Program  
**UPOPs:** Unintentionally Produced POPs

## APPENDICES

**Appendix 1**  
**Pesticides questionnaire**

<b>1</b>	<b>Name of Department</b>					
<b>2</b>	<b>Telephone</b>					
<b>3</b>	<b>Fax</b>					
<b>4</b>	<b>E-mail</b>					
<b>5</b>	<b>Name and signature of the responsible person</b>					
<b>6</b>	Pesticides included in study (please mark pesticides which have been used previously)					
	Aldrin	<input type="checkbox"/>	Dieldrin	<input type="checkbox"/>	Chlordane	<input type="checkbox"/>
	DDT	<input type="checkbox"/>	Endrin	<input type="checkbox"/>		
	HCB (Hexachlorobenzene)	<input type="checkbox"/>	Mirex	<input type="checkbox"/>		
	Toxaphene	<input type="checkbox"/>	Heptachlor	<input type="checkbox"/>		
<b>7</b>	Commercial names of previously used pesticides	1-				
		2-				
		3-				
		4-				
		5-				
		6-				
<b>8</b>	Used quantities					
<b>9</b>	Last year of use					
<b>10</b>	Total quantities of pesticides					
<b>11</b>	Previous fields of use					
<b>12</b>	Repeated use, Periodical	<input type="checkbox"/> Periodical	<input type="checkbox"/> Upon Need			
	Are there any information on plans of use	<input type="checkbox"/> Yes	<input type="checkbox"/> No			
	Area					
	Used pesticide					
	Used quantities					
	Plan starting time					
<b>13</b>	Means of spraying					
<b>14</b>	Method of wastes disposal					
<b>15</b>	Accidents, please provide details on separate sheet					
<b>16</b>	Sources of obtaining of pesticides					
		Import	<input type="checkbox"/>			
		Name of factory				
		Country of origin				
<b>17</b>	Storage	Place of Storage				
		Conditions of storage				
		Stored quantities				
		Validity				
		Date of entry				
		Type of container				
		Size of containers				
		Records of taking out				

18	Have pesticides listed in row 6 been supplied to other departments?		Yes <input type="checkbox"/>	No. <input type="checkbox"/>
		Supplied departments		
		Purpose of supply		
		Use MBThanism		
		Storage if any		
	Spraying procedures, if any with those departments			
19	Re row 18;Quantities supplied			
20	Re row 18; Types of pesticides supplied			
21	Specify type of protection (PPE) used when mixing and applying the pesticides.			
22	Have studies been conducted to follow up levels of these pesticides in the soil, food chain or other organisms?			
23	References to reports from studies to be given : Title, published in/available from, Year/date:			
24	Provide details of storage or disposal of rest quantities, if any, of the pesticides after import and use was prohibited.			
25	Provide details of accidents related to leakage or spill of the pesticides.			
26	Provide details of any records of sickness related to exposure of pesticide.			
27	Sampling procedure	Sample No		
		Remarks About The sample		
28	Remarks:			

**Appendix 2**  
**Information on Possible Sources and Release of PCDD and PCDF**

<b>Industry/Institution</b>	
Location	
Address	
Contact	
Telephone	
e-mail	

**1. Waste incineration**

	<b>Data</b>	<b>Comments</b>
Type of incinerator plant (s)		Solid, liquid, type of waste, number of plants
Operation mode		Continuous, batch (capacity per batch) etc.
Incineration rate		t/h
Annual capacity		t/year
Type of furnace		Please specify in detail
Type of fuel/consumption		Fuel in t/year
Temperature		If the furnace has two or more chambers, specify temperature in all.
Type of air pollution control system or scrubbing system		
Heat recovery		
Volume flow of flue gas		Please refer to dry gas at 20 °C
Residues and effluents		Please give values in t/year and m <sup>3</sup> /year of solid residue and waste water
Disposal of residues		Please include data for all non-gaseous streams

**2. Metal production**

	<b>Data</b>	<b>Comments</b>
Type of plant(s)		
Production rate		t/h
Operation mode		Continuous, batch etc
Annual capacity		
Type(s) of furnace		
Operating temperature		
Fuel type(s) and consumption		Please give annual consumption
Type of air pollution control system		
Volume flow of flue gas		Please refer to dry gas at 20 °C



### 3. Mineral production

	Data	Comments
Type of plant		Cement, bricks etc.
Type of fuel/consumption		Consumption in t/year
Operation mode		Continuous, batch etc.
Production rate		t/h
Annual capacity		
Type and no of furnace(s)		Rotary, shaft, tunnel etc.
Temperature in furnace		
Air pollution control system		
Solid waste/disposal		t/year. Disposal as landfill,
Liquid waste		t/year

### 4. Chemical/petrochemical industry

	Data	Comments
Type of plant		Please indicate main product(s)
Direct fired units/type/temperature in unit		Boilers, gas turbines, crackers etc.
Operation mode		Continuous, batch
Fuel consumption		t/year per unit
Solid waste/type/disposal		t/year
Liquid waste		t/year

### 5. Other possible sources

	Data	Comments
Ground flares		Please give details of past and present locations of ground flares. If possible , give details of quantities and composition of gas/liquid
Known abandoned dump sites for waste.		

### 6. Analysis

Please include copies of any analysis for PCDD and PCDF which you have done on any product or waste stream from your facility.

**Appendix 3**  
**Review of “Toolbox” categories with relevance to Qatar**

No.	Main category name	Sub-category	Existence In Qatar	Source of information
1	Waste incineration	Municipal solid waste incineration	DNE	
		Hazardous waste incineration	EAD	MoE, Industries
		Medical waste incineration	DNE	
		Light-fraction shredder waste incineration	DNE	
		Sewage waste incineration	DNE	
		Waste wood and waste biomass incineration	DNE	
		Destruction of animal carcasses	DNE	
2	Ferrous and non-ferrous metal production	Iron ore sintering	DNE	
		Coke production	DNE	
		Iron and steel production and foundries	EAD	Industry
		Copper production	DNE	
		Aluminum production	DNE	
		Lead production	DNE	
		Zinc production	DNE	
		Brass and bronze production	DNE	
		Magnesium production	DNE	
		Other non-ferrous metal production	EAD	Import statistics
		Shredders	DNE	
		Thermal wire reclamation	DNE	
3	Power generation and heating/cooking	Fossil fuel power plants	AED	Industries and Ministry of Electricity
		Biomass power plants	DNE	
		Landfill, biogas combustion	DNE	
		Household heating and cooking (biomass)	EAD	Import statistics
		Domestic heating (fossil fuels)	END	Only liquefied gas in very small quantities compared to the use of gas in industry

No.	Main category name	Sub-category	Existence in Qatar	Source of information
4	Production of mineral products	Cement production	EAD	Industry
		Lime production	DNE	
		Brick production	DNE	
		Glass production	DNE	
		Ceramics production	DNE	
		Asphalt production	ED	Ministry of Interior
5	Transport	4-Stroke engines	EAD	Industry
		2-Stroke engines	END	
		Diesel engines	EAD	Industry
		Heavy oil fired engines	END	
6	Uncontrolled combustion processes	Biomass burning	NAD	
		Waste burning and accidental fires	END	Municipality, Civil Defense
7	Production and use of chemicals and consumer goods	Pulp and paper production	DNE	
		Chemical industry	EAD	MoE, Industry
		Petroleum industry	EAD	MoE, Industry,
		Textile production	DNE	
		Leather refining	DNE	Ministry of Industry, Chamber for Industry & Trade,
8	Miscellaneous	Drying of biomass	DNE	
		Crematoria	DNE	
		Smoke houses	DNE	
		Dry cleaning	END	Hotels, Laundries
		Tobacco smoking	ED	Import statistics
9	Disposal	Landfills and waste dumps	END	Municipality
		Sewage/ sewage treatment	END	Municipality
		Open water dumping	DNE	
		Composting	END	Composting Site
		Waste oil treatment (non-thermal)	DNE	

No.	Main category name	Sub-category	Existence in Qatar	Source of information
10	Identification of potential hot-spots	Production sites of chlorinated organics	EAD	MoE, Industry
		Production sites of chlorine	EAD	MoE, Industry
		Formulation sites of chlorinated phenols	DNE	
		Application sites of chlorinated phenols	DNE	
		Timber manufacture and treatment sites	DNE	
		PCB-filled transformers and capacitors	EAD	
		Dumps of wastes/residues from categories 1-9	END	
		Sites of relevant accidents	NAD	
		Dredging of sediments	END	MoE
		Kaolinitic or ball clay sites	DNE	
		Ground flare sites	END	MoE, Industry

DNE: do not exist in Qatar; NAD: may exist, but no data is available; END: Exist in Qatar with no available data; EAD: Exist in Qatar, data available

**Appendix 4  
PCBs Inventory Form**

**Name of the City:** \_\_\_\_\_

**Location of The transformer:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Inventory No.:** \_\_\_\_\_

**Sub-station No.:** \_\_\_\_\_

**Sample No.:** \_\_\_\_\_

**Manufacturer:** \_\_\_\_\_ **Serial No.:** \_\_\_\_\_

**Production Year:** \_\_\_\_\_

**Total Weight:** \_\_\_\_\_ **Oil Weight:** \_\_\_\_\_

**Power (kVA):** \_\_\_\_\_

**Cooling Type:** \_\_\_\_\_ **Type:** \_\_\_\_\_

**Upper Voltage:** \_\_\_\_\_ **Lower Votage** \_\_\_\_\_

**Voltage:** \_\_\_\_\_

**Leakage (place):** \_\_\_\_\_

**Corrosion (place) :** \_\_\_\_\_

**Comments:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Name**

**Signature**

## REFERENCES

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