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IMPLEMENTATION PLAN OF THE REPUBLIC OF KAZAKHSTAN ON THE OBLIGATIONS UNDER THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS FOR 2015 - 2018

Astana, 2014

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Abbreviations

UKTMC JSC	JSC "Ust-Kamenogorsk Titanium Magnesium Combine"
HCB	Hexachlorobenzene
HCH	Hexachlorocyclohexane
WHO	World Health Organization
GEF	Global Environment Facility
EEU	Eurasian Economic Union
EMEP	Joint Program for Monitoring and Evaluation of long-range transport of pollutants in Europe
ECE	Economic Commission for Europe
EBRD	European Bank for Reconstruction and Development
VOC	Volatile Organic Compounds
IMF	International Monetary Fund
MHSP	Ministry of Health and Social Protection of the Republic of Kazakhstan
MA	Ministry of Agriculture of the Republic of Kazakhstan
IP	Implementation plan of the obligations of the Republic of Kazakhstan under the Stockholm Convention on Persistent Organic Pollutants
NGO	Non-Governmental Organization
U-POPs	Unintentionally produced persistent organic pollutants
OSCE	Organization for Security and Cooperation in Europe
UN	United Nations
OECD	Organisation for Economic Co-operation and Development
PAH	Polycyclic aromatic hydrocarbons
UNDP	United Nations Development Program
PCB	Polychlorinated biphenyls
PCDD	Polychlorinated dibenzodioxins
PCDF	Polychlorinated dibenzofurans
RK	Republic of Kazakhstan
PTCR	Register of Potentially Toxic Chemicals
IBEMS	Integrated background environment monitoring station
POPs	Persistent organic pollutants
USSR	Union of Soviet Socialist Republics
UNEP	United Nations Environment Programme
UNEP CHEMICALS	UNEP subprogram on chemicals
UNIDO	United Nations Industrial Development Organization

Summary

The National Implementation Plan of the Republic of Kazakhstan on the obligations under the Stockholm Convention on persistent organic pollutants for 2015 – 2018 (hereinafter – NIP) has been developed in the frames of implementation of the Stockholm Convention on persistent organic pollutants (POPs) in the Republic of Kazakhstan. The NIP was developed according to the Law of the Republic of Kazakhstan on the ratification of the Stockholm Convention on POPs, dated 7 June 2007 #259.

Despite the fact that there is no production of POPs, the POPs problem is very urgent for the country. The main sources of pollution with POPs are obsolete and unusable pesticides (including with POPs properties) in agriculture; equipment containing POPs used in industry and transport; the use of technology in the industry, leading to unintentional releases of dioxins and furans; the formation of dioxins and furans in the process of open combustion.

The strategic goal of the NIP is to ensure protection of human health and the environment from persistent organic pollutants.

The NIP addresses the questions of POPs problem solution in Kazakhstan until 2028. Having signed the Stockholm Convention on POPs on May 23, 2001, and ratified it on June 7, 2007, Kazakhstan has declared its intention to follow the course of the international community to the global approach to eliminating chemicals that are hazardous to human health and the environment.

The NIP is based on the results of an inventory on chemicals with POPs characteristics, which was carried out in 2003-2005 and covered the following:

- storages of obsolete and unwanted pesticides;
- PCB-containing equipment
- releases of dioxins and furans
- POPs-polluted territories.

National priorities of the Republic of Kazakhstan are linked with the solution of priority problems in the field of POPs, which need to be addressed in the coming years. Among them:

- detailed inventory of POPs;
- creation of a unified system of POPs control;
- adoption of a special law on the issue of chemical safety and creation of mechanisms for its implementation.
- development of the human capacity in the field of POPs.

In relation to intentionally produced POPs, the Convention stipulates to stop production and use of them. Chemical substances which have to be disposed are listed in Annex A:

- **aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorbenzene, polychlorinated byphenyls (PCB), toxaphene, mirex.**

DDT (produced and used in a number of countries in programs on elimination of carriers of hazardous diseases) is included in the Convention as a chemical substance of limited use (Annex B). In Kazakhstan this issue is not a problem. Malaria is not of epidemic character: no more than ten cases are reported annually during the last years.

Strategic direction of the NIP on the obligations under POPs-containing pesticides. There is no sense to separate POPs-containing pesticides from obsolete and useless pesticides since the latter also pose a threat to the population health and the environment. The strategic directions of activities in this sphere are:

- Detailed inventory including the dumps and outdated places for storage of pesticides not yet investigated, identification and investigation of pesticides in other possible locations (the former airdromes of agricultural aviation, storages of veterinary preparations, storages of medical

materials, medicines, etc.). For this purpose it is necessary to unite the efforts of all concerned ministries and units and to create an integrated database on identified stocks of POPs-containing pesticides using GIS technologies.

- Organization of monitoring of POPs-containing pesticides within the framework of USMSE RK.
- Inventory of dump sites, identification of the amount of stored pesticides and placing them in other containers and storing them in an environmentally safe way in special storages until they may be disposed of.
- Adoption of measures on development and introduction of environmentally safe technology of disposal of identified POPs-containing pesticides stocks. For this purpose it is necessary to provide assessment of available technologies on disposal of hazardous wastes (high temperature combustion methods, incineration in cement kills, parallel combustion for the purpose of electrical energy generation and moving them to other countries, etc.).

Strategic direction of the NIP on the obligations under the Convention in the field of polychlorinated biphenyls (PCBs).

According to the Convention, constant use of PCBs in appropriately operated equipment is allowed until 2025. After removal of PCBs from the equipment, PCBs must not be reused, unless the equipment is properly operated and maintained (Annex A, Part II).

Three primary goals have been identified under the Convention in relation to PCBs:

–**immediate elimination of production of new PCBs,**

–**termination of operation of PCB containing equipment by 2025,**

–**early, and no later than 2028, introduction of environmentally sound elimination of PCB waste.**

Kazakhstan has the following priorities in the sphere of polychlorinated biphenyls:

- Obtaining a more detailed PCB inventory (equipment and contaminated areas).
- Development of a detailed plan of the phase-out of PCB-containing equipment at the state and private sector enterprises with indication of stages and terms of the phase-out.
- Defining the ways of disposal of PCB-containing equipment, wastes and contaminated soil.
- Defining the places for collection and temporary storage of the decommissioned equipment ready for disposal.

Strategic directions of NIP on obligations under the Convention in the field of unintentionally produced POPs. **The Convention has a goal of constant minimization, and where it is possible, complete elimination of all chemical substances releases, listed in Annex C, produced from anthropogenic sources (dioxins, furans, PCB, hexachlorobenzene). A practical measure related to unintentionally produced POPs is the use of best available technologies and best environmental practices.**

Strategic directions of the NIP on obligations under the Convention concerning POPs in stockpiles and wastes. **The goal of the Convention is environmentally safe management of stockpiles, wastes, products and waste articles, consisting of, containing or contaminated with the POPs. In accordance with this, Kazakhstan needs:**

- **to develop and realize appropriate strategies for identifying stockpiles and wastes;**
- **to manage POPs stockpiles and wastes in a safe, efficient and environmentally sound manner;**
- **to take appropriate measures so that POPs waste is:**

–**handled, collected, transported and stored in an environmentally sound manner;**

–**disposed of in such a way that the POPs content is destroyed or otherwise disposed of in an environmentally sound manner as regulated by international rules;**

–**not permitted to be recovered, recycled, reclamated, directly reused or alternatively used;**

–**not transported across international boundaries without taking into account relevant international rules (Basel Convention).**

- **to develop appropriate strategies for identifying sites contaminated with POPs.**

The solution to these problems must be accompanied by the growth of awareness of parliamentarians, government officials, the development of human resource capacity in the field of chemical safety, the active participation of enterprises and community, the informing and training of different groups of the population, especially in rural areas.

Activities of the NIP will complement the existing types of national activities in their respective areas. As part of the activities of the NIP, cooperation will be arranged with relevant ministries and departments in questions of collection and storage of obsolete pesticides, conducting a detailed inventory of POPs and their safe storage.

The organization responsible for the implementation of the NIP Republic of Kazakhstan is the authorized body in the field of environmental protection. Various execution agencies will be responsible for specific activities. To evaluate the effectiveness of execution agencies, they will prepare summary reports on the measures taken, which will include a description of the measures and the results of the NIP. The authorized body in the field of environmental protection will perform control functions.

Reduction of POPs in environmental media and food will indicate the successful implementation of the proposed action plan in the NIP. If the performance evaluation shows that the risk of POPs is not enough decreased, further measures can be taken.

This updated implementation plan on obligations of Kazakhstan under the Stockholm Convention on POPs has been prepared by a joint project of the Government of the Republic of Kazakhstan and United Nations Development Program in the Republic of Kazakhstan "NIP update, integration of POPs into national planning and promoting sound healthcare waste management in Kazakhstan".

Preparation and updating of the NIP was conducted in accordance with the technical guidance on the development of implementation plan for the Stockholm Convention prepared by the World Bank and UNEP Chemicals.

The NIP is an operational document, which presents a structure of implementation of the Stockholm Convention in the Republic of Kazakhstan. The NIP is based on wide-ranging consultation with the partners in close collaboration with national institutions. Involvement of all stakeholders in the implementation of the NIP is a prerequisite for achieving the goals. Clear division of responsibilities and tasks is a key element of the NIP implementation, and this requires the establishment of close inter-agency cooperation and good coordination.

Introduction

Persistent organic pollutants (POPs) - is a group of chemicals that possess toxic properties, resist degradation and bio-accumulate. These chemical compounds and mixtures 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. Even small doses of POPs can harm normal biological functions, pass on to next generations and pose a threat for human health and the environment.

In order to protect human health and the environment from persistent organic pollutants, the governments of more than 100 countries have adopted the Stockholm Convention on Persistent Organic Pollutants on May 22, 2001, in Sweden, the objective of which was to reduce and in the end eliminate production, use, releases and storage of POPs.

The Stockholm Convention on POPs initially covered 12 the most dangerous pollutants (a "black dozen"), which are divided into categories:

a) Pesticides which were earlier used to combat weeds, insect pests and for disease vector control - aldrin, dieldrin, endrin, mirex, chlordane, heptachlor, DDT, toxaphene, hexachlorobenzene (that are also industrial POPs and production wastes);

b) Substances used in the industry as thermal liquid, in electrical transformers and capacitors, and as paint agents – polychlorinated biphenyls and hexachlorbenzene;

c) Unintentional emissions of dioxins and furans in the metallurgical, cement, pulp and paper, chemical, paints and colors production, during combustion of household waste and fires. Also, dioxins and furans can be found in vehicle emissions, tobacco, wood and coal smoke.

In May 2009 at the 4th Conference of Parties, nine more chemicals were included in the list under the Stockholm Convention: chlordecone, pentachlorobenzene, lindane, alpha hexachlorocyclohexane; beta-hexachlorocyclohexane; hexabromobiphenyl, polybrominated biphenyl ether, octabromobiphenyl ether; perftoroctane sulfonate.

At the 5th Conference of Parties of the Stockholm Convention, which was held in Geneva during 25-29 May, 2011, Annex A to Stockholm Convention was complemented with technical endosulfan and its isomers (with certain exceptions). This persistent organic pollutant became the 22nd in the list of POPs.

Stockholm Convention pursues five major goals:

1) Elimination of dangerous POPs, starting with the 12 most toxic chemicals.
2) Promotion of transition to safer alternatives.
3) Identification of additional POPs in order to take necessary measures.
4) Elimination of old stockpiles and POPs-containing equipment.
5) Collaboration to achieve POPs-free future.

The provisions of the Stockholm Convention provide for:

- **measures to reduce or eliminate;**
  - **intentionally produced POPs,**
  - **unintentionally produced POPs,**
  - **stockpiles and wastes,**
  - **areas contaminated with POPs;**
- **inclusion in the Convention of new chemicals;**
- **financial and technical assistance;**
- **aspects of the implementation.**

The Republic of Kazakhstan has signed the Stockholm Convention on POPs on May 23, 2001. The Convention was ratified by the Law of the Republic of Kazakhstan dated June 7, 2007, № 259 "On ratification of the Stockholm Convention on Persistent Organic Pollutants" and Kazakhstan became a Party to the Convention on September 9, 2007.

As a Party to the Stockholm Convention, Kazakhstan has obligations aimed at implementing the provisions of the Convention. In particular, the Republic of Kazakhstan:

- develops and executes an implementation plan on obligations under the Convention;
- povides its implementation plan to the Conference of the Parties within two years after the date of entry of the Convention into force for the country;
- organizes framework for capacity building to implement obligations under the Stockholm Convention on POPs and technology transfer;
- takes measures to reduce the total emissions from anthropogenic sources of each of the chemicals listed in Annex C, with a view to their continuing minimization and, where feasible, ultimate elimination;
- takes measures to reduce or eliminate releases from stockpiles and wastes of POPs;
- facilitates or undertakes the exchange of information on POPs and designates a national focal point for the exchange of such information;
- facilitates the provision of all available information on POPs to the public, ensures measures for awareness raising and training of all stakeholders;
- within existing resources, encourages scientific research, development, monitoring and cooperation on all aspects of POPs and their alternatives.

Despite that there is no production of POPs in Kazakhstan, the POPs problem is very urgent for the country. The main sources of POPs pollution are obsolete and unwanted agricultural pesticides (including pesticides that comprise POPs characteristics); POPs-containing equipment; use of industrial technologies resulting in unintentional releases of dioxins and furans; formation of dioxins and furans during open combustion.

The agriculture of the country faces an urgent problem of obsolete and unwanted pesticides and their chemical identification. More than 1500 tons of such pesticides and mixtures of them are stored across the country, some of them are stored in piles in unsuitable worn out facilities, some with leaking roofs. Approximately 10% of these are pesticides with POPs characteristics. The inventory of pesticides with POPs characteristics covers only 20% of the country. Pesticides buried earlier are also planned to be extracted and eliminated. Pollution of soil by pesticide waste with POPs characteristics is irregular and decontamination of territories polluted by POPs is needed.

In addition, there is a problem with the recycling of pesticide packaging containers (more than 330 thousand units). Containers pose a threat to health of the population because they are often ignorantly used by people for household purposes to store foodstuffs and water.

From 1968 to 1990 PCBs were used at the Ust-Kamenogorsk capacitor plant in industrial production as a liquid for filling capacitors. Equipment containing PCBs constitutes a problem. Currently, on the territory of the Republic, the following PCB-containing equipment has been identified: 116 transformers and about 50 thousand capacitors. The volume of PCBs content in them is roughly estimated at 980 tons. This equipment poses a great danger to the workers towards the end of its operating life, when leakage may occur. The total amount of waste containing PCBs is estimated at 250 thousand tons. Regarding the POPs waste stock Republic of Kazakhstan occupies the second place among Eastern and Central European countries (with Russia in the first place) when it comes to stockpiles of POP waste.

8 sites polluted with persistent organic pollutants have been identified in Kazakhstan. Information about the "hot spots", areas contaminated with POPs in Kazakhstan, has been sent to the International POPs Elimination Network (IPEN) for its location on the world map of POPs "hot spots".

In accordance with requirements of the Stockholm Convention, the Convention parties should prepare an implementation plan - a plan showing how they intend to meet their obligations under the Convention, and to make every effort to implement this plan into operation.

In 2009, the Order of the Minister of Environmental Protection of the 8th December 2009 № 261-O approved an Implementation Plan of the Republic of Kazakhstan on the obligations under the Stockholm Convention on POPs, providing for measures to control POPs included in the initial list of the Convention.

Currently, a need has arisen to update the NIP due to the inclusion of new POPs in the Stockholm Convention list as well as in connection with the planned updating of the provisions of the NIP.

This updated plan on the obligations of the Republic of Kazakhstan under the Stockholm Convention on POPs has been prepared in the frames of the joint project of the Government of the Republic of Kazakhstan and United Nations Development Program in the Republic of Kazakhstan "NIP update, integration of POPs into national planning and promoting sound healthcare waste management in Kazakhstan".

Preparation and updating of the NIP was conducted in accordance with the technical guidance on development of the implementation plan for the Stockholm Convention prepared by the World Bank and UNEP for chemicals.

The process of development and updating the NIP involved representatives of stakeholders: government agencies, non-governmental organizations, research institutes, businesses and other organizations working in the field of environmental protection, agriculture, industry and healthcare.

Current NIP is a document containing an evaluation of the POPs issue, including new POPs, in the Republic of Kazakhstan and measures to address these problems in order to meet the obligations of the Stockholm Convention.

1. GENERAL OVERVIEW

1.1. General country profile

1.1.1 Geography and population

The Republic of Kazakhstan is a Central Asian country situated at the heart of the Eurasian continent between *40°56′* and *55°26′ N* and *45°27′* and *87°18′ E*, occupying an area of 2 724,9 thousand km^2 (the ninth largest country in the world).

Administratively the country is divided into 14 regions (oblasts), 2 cities of republican importance, 175 administrative districts, 87 cities, 34 villages and 6947 rural settlements. The capital is Astana (since 1997).

The population of Kazakhstan is 17 160 774 people (as of 1 January 2014). Urban population – 55%, rural population - 45%.

The following population groups are especially vulnerable to POPs: children younger than 14 years old – 27.3%, and elderly people – 10.4%.

Transparency of the boundaries can facilitate the illegal import of POPs into Kazakhstan. Taking into account the transparency of the borders with Russia, Uzbekistan and Kyrgyzstan, it can be presumed that in addition to the registered companies, there are organizations illegally importing pesticides, including POPs, into the republic.

A huge latitudinal extent of the country (more than 3,000 km from the north to the south), with four geographic zones (deserts, semi-deserts, steppes and partially wooded steppes) theoretically welcomes a "grasshopper effect". "Grasshopper effect" means that POPs entering the environment in one region of the world can move in the atmosphere through repeated processes of evaporation and precipitation to the regions located at a considerable distance from the primary source.

The climate of Kazakhstan is continental and dry. Most part of the country is inland which limits long-range environmental transport of POPs by water, but at the same time, encourages their concentration in the isolated inland areas.

Kazakhstan is mainly a plain type country, opened from the north and west to air intrusion. Because of the domination of air-masses from the west, transboundary flows with POPs from industrial countries of Central and Eastern Europe can easily enter the northern regions of Kazakhstan. From the east and south-east, Kazakhstan is protected by the mountains from outside intrusions.

1.1.2 Political and economic profile

In accordance with the Constitution, the Republic of Kazakhstan is a unitary democratic social law-governed state. State power is exercised by the President of the Republic of Kazakhstan, the Parliament and the Government of the Republic of Kazakhstan, and the courts of the Republic of Kazakhstan.

President of the Republic of Kazakhstan is the head of the state. Parliament of the Republic of Kazakhstan is a representative and legislative body of the country and consists of two chambers - the Mazhilis (lower chamber) and the Senate (upper chamber). The government exercises executive power and performs the functions of public governance. The government system is based on functional-branch and territorial principles.

From the first day of independence, Kazakhstan actively participates in the work of the UN and its specialized agencies. The main objectives of this activities are the following: to

carry out the work on the strategic interests of the Republic of Kazakhstan in the international arena in the field of global and regional security; formation of a just world order in politics and the economy; creating a framework for sustainable development, harmonization of relations between the members of the world community.

Since January 1992, Kazakhstan is a member of the Organization for Security and Cooperation in Europe (OSCE). Joining the organization was motivated by the desire of the Republic of Kazakhstan to actively participate in European processes, allowing for development and implementation of principles of the Helsinki Final Act of 1975 and other OSCE documents. Kazakhstan is also a member of several regional organizations such as the Commonwealth of Independent States (CIS), the Customs Union with Russia and Belarus, the Eurasian Economic Union (Russia, Belarus, Kazakhstan), the Central Asian Economic Community (Kyrgyzstan, Uzbekistan and Tajikistan) and the Shanghai Cooperation Organization (SCO).

1.1.3 Profile of economic sectors

According to the Ministry of economy and budget planning, the growth of production services in Kazakhstan in 2013 was 7.4%, while the share in the growth of the economy was - 3.9%, while the share of manufacturing goods was 1.4%. Growth of products release in the industry in 2013 was 2.3%. In manufacturing, the highest rates showed the engineering sector with growth at 14.6%, which provided 88% growth for the processing industry of Kazakhstan.

The most capital intensive activities are the production of crude oil and associated gas, metallurgy, production and distribution of electricity, gas and water.

During the period from 2009 to 2013, GDP grew by 91% and in 2013 amounted 12.9 thousand US dollars per capita. In addition, the economic effect of Kazakhstan was stipulated by the presence of rich nature resources. By amounts of coal, oil, gas, chromium, uranium, zinc, iron ore, copper, gold, and the volume of their production Kazakhstan is among the 15 leading countries of the world. About half of the budget revenues and 70% of exports are based on revenues from natural resources. Of these, oil revenues account for about half of the budget; export products of the extractive industries account for 76% of which 71% comes from hydrocarbons. Overall, 17% of the economy is based on the resource-dependent industry.

Agricultural land in Kazakhstan (of January 1, 2013) make up 93,4mln.*ha* (35.8%). The total area of woodland (including woods transferred for temporary use) is - 28.8 million hectares (as of 1 January, 2012). Land covered by forest - 12.4 million hectares.

Provided below (Tables 1-3) is basic information on the industrial and agricultural sectors of the Republic of Kazakhstan.

Table 1- Gross Domestic Product by the production method

Name	2013	
	mln. tenge	structure, %
Gross Domestic Product by the production method	35 275 153,3	100,0
Agriculture, forestry and fishing	1 621 194,5	4,6
Mining and quarrying	5 477 694,0	15,5
Manufacturing	3 828 486,9	10,9
Electricity, gas, steam and air conditioning	580 317,6	1,7
Water supply; sewerage system, control over the collection and distribution of waste	99 498,1	0,3
Construction	2 145 248,5	6,1

Wholesale and retail trade; repair of motor vehicles and motorcycles	5 415 975,3	15,4
Transportation and warehousing	2 736 538,1	7,8
Services for accommodation and meals	311 180,4	0,9
Information and communication	946 161,4	2,7
Financial and insurance activities	986 543,5	2,7
Real estate transactions	3 019 353,0	8,6
Professional, scientific and technical activities	1 530 057,1	4,3
Activities in the field of administrative and support services	637 108,6	1,8
Public administration and defense; compulsory social security	711 439,5	2,0
Education	1 029 843,4	2,9
Health and social services	577 127,0	1,6
Arts, entertainment, and recreation	243 360,9	0,7
Other services provision	972 543,9	2,8
Activities of households as employers of domestic staff and producing goods and services for personal consumption	15 269,0	0,0
Total by industries	**32 884 940,7**	93,3
Indirectly measured financial intermediation services		
Gross value added in the production account	**32 884 940,7**	93,3
Taxes on products in the production account	**2 481 737,6**	7,0
Subsidies on products in the production account	**94 525,0**	0,3

Table 2 – Industrial output by regions (2013)

mln. tenge

Republic of Kazakhstan	17 833 994
Akmola oblast	291 655
Aktobe oblast	1 285 682
Almaty oblast	588 507
Atyrau oblast	4 614 217
West Kazakhstan oblast	1 659 662
Zhambyl oblast	233 946
Karaganda oblast	1 324 735
Kostanay oblast	530 474
Kyzylorda oblast	1 164 136
Mangistau oblast	2 187 307
South Kazakhstan oblast	552 558
Pavlodar oblast	1 334 756
North Kazakhstan oblast	150 398
East Kazakhstan oblast	998 701
Astana city	276 217
Almaty city	641 043

Table 3 - Gross output of goods (services) in agriculture by regions (2013)

in current prices, mln. tenge

Republic of Kazakhstan	2 386 103,5
Akmola oblast	231 590,4
Aktobe oblast	125 376,4
Almaty oblast	377 013,9
Atyrau oblast	44 029,9
West Kazakhstan oblast	79 678,4
Zhambyl oblast	127 346,6
Karaganda oblast	142 864,8
Kostanay oblast	230 861,6
Kyzylorda oblast	48 569,1
Mangistau oblast	8 036,6
South Kazakhstan oblast	296 993,7
Pavlodar oblast	118 680,7
North Kazakhstan oblast	264 936,4
East Kazakhstan oblast	287 755,2
Astana city	1 696,7
Almaty city	673,1

The chemicals in Kazakhstan are produced at oil refining, mining, chemical, construction and pharmaceutical industries.

The main types of chemical products in Kazakhstan include the production of sulfuric acid, chromium compounds and phosphorus. Enterprises of the Republic use a wide range of chemicals (acids and alkalis, solvents, dyes, etc.). The export structure is dominated by gas, oil products, sulfuric acid, yellow phosphorus and its compounds, fertilizers, and chromium compounds. The import bases on plant protection products and industrial chemicals.

In 2012, the volume of production (formulation) of pesticides in Kazakhstan has decreased and amounted to 9,100 tons, of which 8,400 tons - herbicides.

Thus, despite there is no production of POPs in Kazakhstan, POPs-containing pesticides and products can come from other countries.

1.1.4 Environment overview

Dynamics of key environmental indicators of the Republic of Kazakhstan shows an increase in the negative impact on the environment (total emissions from stationary and mobile sources, the volumes of waste due to the low level of their recycle).

Problems associated with chemicals in the Republic of Kazakhstan occur at regional, national and local levels.

Priority problems related to chemicals and their descriptions are shown in Table 4.

Table 4 – Priority problems associated with chemicals[1]

№ п/п	Nature of the problem	Scale of the problem	Problem severity	Particularly problematic chemicals	Priority level[2]
1	Air pollution	regional	High	SO_2, NO_x, CO, dust, O_3, ПАУ	1
2	Presence of hazardous chemicals in food	National	High	Pesticides, nitrates	1

3	Drinking water contamination	National	High	Heavy metals, petroleum products	1
4	Recycling / destruction of hazardous wastes	National	High	Radioactive waste, obsolete pesticides, slag, etc.	1
5	Occupational health in agriculture	Regional	High	Pesticides, fertilizers	1
6	Healthcare	National	High	Depending on a region	1
7	Storage / disposal of waste (obsolete prohibited, unusable chemicals)	Local	High	POPs, pesticides, etc.	1
8	Chemical poisoning / suicides	National	Medium	radionucleides	1
9	Contamination of inland waters and waterways	Local	High	PAHs, phenol, heavy metals, pesticides, POPs	2
10	Groundwater contamination	Regional	Medium	Pesticides, petroleum products, PCBs, heavy metals	2
11	Soil contamination	Local	Medium	Petroleum products, pesticides, heavy metals	2
12	Occupational health in the industry	National	Medium	CO, SO_2, NO_x, heavy metals, Cr^{6+}, phenol, VOCs, hydrocarbons	2
13	Chemical accidents (at work)	Local	Medium	H_2S, NH_3, Cl_2, hydrocarbons, serum containing.	2
14	Chemical accidents (transport, pipelines)	Local	Medium	Hydrocarbons, Cl_2, NH_3, HFL, compressed gases	2
15	Illegal imports of unknown chemicals	Local	Medium	Narcotic, flammable substances	2
16	Industrial POPs	National	Medium	New substances under the Stockholm Convention, PCBs (PCTs)	2
17	Pollution of the seas and lakes	Transboundary	Medium	Petroleum products, pesticides, heavy metals, PCBs	3

Note:
1: Source: National profile on chemicals management in the Republic of Kazakhstan, Astana, 2013.
2: 1 – the most serious problems, 2 – next problem(s) by the importance, etc.

Air pollution is a particular problem for the cities of Almaty, Ust-Kamenogorsk, Temirtau, Karaganda, Aktobe, Reeder, Taraz, Shymkent. The main source of emissions in Almaty is transport, while in other cities - industrial enterprises.

Contamination of surface waters is mainly caused by discharges of municipal and industrial wastewater.

The problem of mercury contamination is acute in Pavlodar and Karaganda regions. Thus, Balkyldak Lake at the Pavlodar Chemical Plant accumulates about 900 tons of mercury. Mercury was also detected in the silt of the river Nura, which got there from the JSC "Karbid" company

(Temirtau). Both sources of contamination pose a threat of mercury entering the transboundary rivers Irtysh and Ishim and further moving into the Arctic Ocean. The state undertakes measures to address these problems, but the efforts of Kazakhstan on its own are not enough for a complete solution of the problem.

Groundwaters are contaminated almost over the entire territory of the republic. Sources of pollution include extensive agriculture and the use of fertilizers, and disposal of hazardous waste in landfills and their improper use.

1.2. Institutional, policy and regulatory framework

1.2.1 Environmental policy, sustainable development policy and general legislative framework.

Country's international commitments are an important basis for the development of policy in the field of environmental protection and sustainable development policy, as well as for the formation of legislation in the field of environmental protection and chemical safety.

The Republic of Kazakhstan has adopted the Concept for the transition to a "green economy", approved by the President of the Republic of Kazakhstan on May 30, 2013. This concept defines a new policy of the state up to 2050, which places environmental priority along with economic and social development.

"Green Economy" is defined as an economy with a high level of quality of life, careful and rational use of natural resources for present and future generations, which follows international environmental commitments accepted by the country, including the Rio de Janeiro principles, the Agenda of the XXI Century, the Johannesburg Plan and the Millennium Declaration.

"Green economy" does not negate or replace the idea of sustainable development as a tool to achieve sustainable development.

The concept of "green economy" lays the foundation for deep systemic change to improve the living standards of the population of Kazakhstan and to allow the country to enter the 30 most developed countries of the world while minimizing the impact on the environment and natural resource degradation.

The main priority task for the transition to a "green economy" for the country are:

1) increasing efficient use of resources (water, land, biological and others) and their management;

2) modernization of existing and construction of new infrastructure;

3) improving welfare of the population and the quality of the environment through cost-effective ways to mitigate the pressure on the environment;

4) enhancing national security, including water security.

One of the directions of the Concept of transition to a "green economy" is waste management. This direction, along with measures to improve the waste management system, includes the issues of chemical safety. In particular, according to the Concept of transition to a "green economy", it is necessary to carry out the following activities:

1) to improve the legal mechanisms for regulation of chemicals, to harmonize legislation in the areas of healthcare, industrial health and safety, environmental protection, including the register of chemical products with the requirements of the Law "On safety of chemical products";

2) to ensure the implementation of environmentally sound technologies and processes, including technologies for the destruction of wastes containing persistent organic pollutants and other hazardous waste;

3) to implement an international system of classification and labeling of chemicals;

4) to enhance the system of statistical reporting and accounting of chemicals at the state level with the formation of registers of release and transfer of chemicals at the regional and national

levels;

5) to provide material and technical equipment of territorial analytical laboratories to obtain reliable operational data on pollution of surface and groundwater, soil and air.

As part of the Concept of transition to "green economy", a Program for modernization of the solid household wastes management was designed for 2014 - 2050. In addition, the development of the Program of industrial waste management is planned, which will also include measures aimed at improving the system of chemical safety.

1.2.2 Roles and responsibilities of ministries, departments and other government agencies involved in the issue of POPs

Preparation of the NIP involved conduction of the analysis of roles and responsibilities of different stakeholders in chemical safety provision. Table 5 presents an analysis of jurisdiction and programs of ministries and other government agencies in charge of issues related to chemicals and responsible for various aspects of the management of chemicals in accordance with the current legislation on chemicals management, including POPs.

Table 5 – General functions related to the management of chemicals, including POPs

Institute	Production of chemicals	Import / export	Storage / Stock-piles	Transportation	Waste mngt	Contaminated areas	Alternatives, links	Health and safety
Ministry of energy	+		+	+	+	+	+	+
Ministry of health and social development	+		+				+	+
Ministry of agriculture (regarding pesticides)	+	+	+	+		+		
Ministry of investments and development	+		+	+	+	+	+	+
Ministry of culture and sports							+	
Ministry of education and science	+						+	
Ministry of foreign affairs							+	
Committee on emergency situations of the Ministry of internal affairs				+				
Committee of customs control of the Ministry of finance		+	+	+				
Manufacturing sector, industrial	+	+	+	+	+		+	+

Institute	Production of chemicals	Import / export	Storage / Stock-piles	Transportation	Waste mngt	Contaminated areas	Alternatives, links	Health and safety
associations								
NGO	+		+	+	+	+	+	+
Farmers and agricultural associations			+			+	+	+

Obligations of the relevant ministries, government agencies and institutions are based on the specific regulations related to the instructions for certain types of chemicals (eg, pesticides, transportation of hazardous goods, narcotics, psychotropic substances, medicines, etc.). In many cases, roles, responsibilities and competencies of different ministries and departments are duplicated, there is no coordination of their actions, the presence of various obligations on certain groups of chemicals leads to fragmentation of their actions, because each agency is concerned only with those groups of chemicals that are under their competence.

1.2.3 Relevant international agreements and commitments

The Republic of Kazakhstan is actively involved in the international regulation of chemical safety.

Kazakhstan has ratified a number of international agreements and conventions in the field of chemical safety and related to the POPs issue. These documents include the following: Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (2003); Rotterdam Convention on the advance informed agreement procedure in international trade for Certain Hazardous Chemicals and Pesticides (2007); Stockholm Convention on Persistent Organic Pollutants (2007) and European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) (2001).

Country's international commitments are an important basis for the development of national legislation in the field of chemical safety.

The legislative framework of the Republic of Kazakhstan has already been partially harmonized with the Basel Convention. In particular, the classification of waste is carried out under the Basel Convention on the three levels of danger. The Rules for import, export and transit of waste are approved in Kazakhstan (Government Resolution dated July 11, 2007, № 594), which fully complies with the Basel Convention.

Kazakhstan is annually preparing the National Report on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, which are provided to the Secretariat of the Basel Convention.

Since the ratification of the Rotterdam Convention, Kazakhstan has gained access to information on toxic chemicals in the framework of that Convention, and their impact on human health and the environment. Using these data, the country can build its own policy on the use, prohibition or restriction of toxic substances referred to in the Convention. Implementation of the Rotterdam Convention tools will improve the system of control and management of chemicals in Kazakhstan.

1.2.4 Description of existing legislation in the field of POPs

The main national laws outlining the requirements for chemical safety in the Republic of Kazakhstan, are the following:

- Environmental Code of January 9, 2007;
- Labour Code of May 15, 2007;
- Code of the Republic of Kazakhstan dated September 18, 2009 № 193-IV «On people's health and the healthcare system;
- Criminal Code of 16 July 1997;
- Code "On taxes and other obligatory payments to the budget" of December 10, 2008, (Tax Code);
- The Law of July 21, 2007, № 302-III "On the safety of chemical products";
- The Law of July 3, 2002, № 331-II "On Protection of Plants".

The main piece of legislation governing the treatment of POPs is the Environmental Code of the Republic of Kazakhstan. According to Chapter 40 of the Environmental Code of the RK, "environmental requirements for the production and use of potentially hazardous chemical and biological substances, genetically modified foods and organisms" are being established.

In January 2012, 11 new items related to the management of POPs, including PCBs were included in the Environmental Code. In particular, Article 1 was complemented with the concept of "persistent organic pollutants":

"persistent organic pollutants – are the most dangerous organic compounds that are resistant to degradation, characterized by bioaccumulation and are transported through air, water and migratory species and deposited far from their place of release, where they accumulate in terrestrial and aquatic ecosystems, causing destruction of immune and endocrine systems of living organisms and various diseases, including cancer "

In the frames of these changes the powers of the authorized body in the field of environmental protection have been strengthened in relation to adoption of regulations governing the safe management of POPs and state management of hazardous chemicals, including persistent organic pollutants, as part of the obligations of international treaties such as the Basel, Stockholm and Rotterdam Conventions (Article 17 of the Environmental Code).

The Environmental Code has set a ban on the manufacture, use, import and disposal of pesticides and other products containing persistent organic pollutants, as well as products, the use of which can form the POPs wastes (Article 329), and included environmental requirements for storage of wastes containing persistent organic pollutants (Article 293-1, 298).

An Environmental code also includes a point on development of the program for disposal of POPs (Article 324).

In the frames of implementation of paragraph 29 of Article 17 of the Environmental Code, Order of the Minister of Environment of the Republic of Kazakhstan dated February 24, 2012, № 40-Ө approved the Rules for handling of persistent organic pollutants and wastes containing them. The Rules govern the access to persistent organic pollutants and wastes containing them throughout the life cycle, which includes:

1) inventory of electrical equipment;
2) exploitation of PCB-containing equipment;
3) decommissioning of PCB-containing equipment;
4) packaging of PCB-containing wastes;
5) labeling of PCB-containing wastes;
6) organization of storage of PCB-containing wastes;
7) transportation of PCB-containing wastes.

These Rules require conduction of an inventory of oil-filled electrical equipment for contamination with PCBs. The requirement to conduct such a detailed inventory is foreseen by the Part II (Polychlorinated biphenyls) of Annex A of the Convention on POPs.

Confirmation of the presence or absence of PCBs in oils and other insulating fluids should be proved either by laboratory analysis or testing. In this regard, the inventory is carried out in two phases with specific timing for each stage.

The requirements for packaging, labeling and transportation meet the international requirements included in the documents of the Basel Convention, ADR, and Global GHS classification system.

Eight guidelines on various aspects of POPs and PCBs in particular have been developed to help businesses, government regulatory bodies and all stakeholders. These are the following guidelines:

1. PCB Management Guideline. It contains full information on PCBs: its properties, effects on human health and the environment, trade names, production and application in the world and in the Soviet Union, types and brands of equipment, manufactured with PCBs. Also it provides detailed procedures for operation of such equipment, measures for the prevention and mitigation of the leakage of PCBs, fire and other emergencies. In addition, it presents information on personal protection and measures to provide first aid in cases of poisoning or electric shock.

2. Model PCB Management Plan for enterprises, owners of PCB equipment. This handbook would be a good support for the owners of PCB equipment in developing their own plans, which should include all phases of its life cycle, starting with an inventory, labeling, operation, ending with temporary storage and transportation to the final destruction. Each company can add information or cut sections where they think appropriate, using the Model Plan as a basis.

3. Guidelines for the temporary storage of PCB-containing equipment and wastes. This manual describes the structure for the storage of hazardous waste, construction of floors, ventilation system and provision of fire fighting equipment. It prescribes requirements for personnel, for the procedures for receiving, storing, loading and unloading and repacking, if necessary. It also describes the measures in case of emergency (fire, spills, etc.).

4. Review of PCB disposal technologies. It provides a review of existing technologies for disposal of PCBs. The analysis of the advantages and disadvantages of each method, each evaluated in terms of the needs of Kazakhstan and economic feasibility.

5. Guidelines for Risk Assessment of PCB contaminated areas. It includes recommendations for further work in this area for Kazakhstan. This manual describes the principles of risk assessment from exposure to PCBs of the environment and human health, and the detailed forms and sources of emissions, pathways and metabolism of PCBs in the environment, forms and ways of influence on living organisms. It presents different approaches to risk assessment of PCBs in the various components of the environment and human health

6. A practical guide for risk assessment. This manual is designed for inspectors and experts to conduct a risk assessment at enterprises with PCB equipment and/or waste. It describes the procedure for conducting assessment: what issues should be covered in the assessment, which features are necessary to pay priority attention, such as whether there is a management plan for PCBs and training to whether there are PPEs, means for the prevention and elimination of

consequences of spills and fires. It presents the sampling procedure for estimating the degree of contamination of the enterprise and assess the impact of PCBs on the environment and the health of workers and population of the surrounding areas

7. Review of the current situation on POPs monitoring in the environment in Kazakhstan and abroad. It describes monitoring of POPs in different countries and approaches to global monitoring plan adopted at the Third Conference of the Parties to the Stockholm Convention on POPs. It is based on the experience of RECETOX - official Stockholm Convention Regional Centre for Central and Eastern Europe and the CIS. It also describes procedures and approaches to sampling of air, water, and human milk.

8. Structure of the proposed network for monitoring of persistent organic pollutants (POPs) in Kazakhstan. Based on the experience of other countries in the monitoring of POPs and taking into account the requirements of the Global Monitoring Plan, the recommendations were designed for the development of a system for monitoring of POPs in Kazakhstan.

The basic law in the field of chemical safety is the Law of the Republic of Kazakhstan "On safety of chemical products" (hereinafter - the Law). The Law defines the requirements necessary to ensure the safety of chemicals and processes of their life cycle, affecting human health and the environment. These requirements generally apply to hazardous chemicals, and do not apply to ready pharmaceuticals, radioactive substances and materials, or food.

Registration of chemicals is the responsibility of the manufacturer (or supplier, or importer). The procedure for registration of chemical products includes the mandatory development of the safety data sheet, which must be developed in accordance with the national standard ST RK 1185.

Currently in Kazakhstan there are three chemical registries: registry of chemicals used in industry (controlled by the Committee of Industrial Development and Industrial Safety of the Ministry of Investment and Development), the registry of chemicals used in agriculture, mainly comprising of pesticides (controlled by the Ministry of Agriculture), and Inventory of Chemical Substances classified as harmful to human health (controlled by the Committee on Consumer Rights Protection of the Ministry of National Economy of the Republic of Kazakhstan). Currently, these registries do not provide free access to entrepreneurs or citizens.

The law "On safety of chemical products" does not define any specific provisions on POPs. However, it prohibits the use of the following chemicals:

- products with clear evidence of danger to human health, for example, in the case of the information available about the actual danger to human health and the environment;
- products without registration;
- products without documentary evidence of safety and origin;
- lack of products with labels on warning,
- products that do not meet the information provided.

If any such products are revealed or pointed on the basis of guidance from the government, the manufacturer (or supplier or importer) should suspend one or more processes of the life cycle of chemicals, that is, to withdraw the product from circulation.

One of the main objectives of the Law of the Republic of Kazakhstan "On Plant Protection" is a warning and prevention of harmful effects of pesticides (toxic chemicals) on human health, pollution of agricultural products and environment during phyto-sanitary measures. Law "On Protection of Plants" includes a number of provisions aimed at regulating chemical safety issues and related pesticides (toxic chemicals). Pesticides (toxic chemicals) are defined as chemical, biological and other substances used against harmful and especially dangerous pests, as well as for

pre-harvest drying, removal of leaves and plant growth regulation. In accordance with the Law, the competence of the authorized body includes:

1) development and adoption of technical regulations in the field of pesticides (toxic chemicals);

2) development and approval of qualification requirements:

- manufacturing (formation) of pesticides (toxic chemicals);
- realization of pesticides (toxic chemicals);
- use of pesticides (toxic chemicals) by aerosol and fumigant ways;

3) approval of the rules of registration, testing and production of state registration of pesticides (toxic chemicals);

4) state registration of pesticides (toxic chemicals) and issuing of registration certificates for the right to the use of pesticides (toxic chemicals) in the territory of the Republic of Kazakhstan;

5) development, adoption and maintenance of a list of pesticides (toxic chemicals);

6) organizing and conducting public procurement of pesticides (toxic chemicals), works and services for their storage, transportation, use and creation of stocks of pesticides (toxic chemicals) in accordance with the legislation of the Republic of Kazakhstan;

7) organization registration, production testing and registration of pesticides (toxic chemicals);

8) distribution of pesticides (toxic chemicals), acquired at the expense of budget funds, in the territory of the Republic of Kazakhstan, depending on the emerging data on phyto-sanitary monitoring and phyto-sanitary conditions;

9) establishment of requirements for the reserves by type of pesticides (toxic chemicals) and the order of their use;

10) organization and implementation of the state phyto-sanitary control;

11) determination of the disposal order of pesticides (toxic chemicals) in coordination with the state authorities in the field of environmental protection and public health.

When addressing the detoxification issues, including disposal in specialized stores, unwanted pesticides and agrochemicals, it is necessary to follow the Article 14-1 of the Law "On Protection of Plants":

1) prohibited, unwanted pesticides (toxic chemicals) and containers out of pesticides (toxic chemicals) are subject to detoxification. Procedures for detoxification of pesticides (toxic chemicals) are determined by the competent authority in consultation with the state authorities in the field of environmental protection and public health.

2) special storages (repositories) are used for the detoxification of pesticides (toxic chemicals)

3) permission to build special storages (repositories), as well as for detoxification of pesticides (toxic chemicals) is issued by the authorized state body in the field of environmental protection.

4) the appropriateness of placement of special storages (repositories) in the regions and their number are determined by the local executive bodies of regions, cities and the capital as agreed with the state authorities in the field of environmental protection and public health.

In this regard, the Order of the Minister of Agriculture of the Republic of Kazakhstan dated July 6, 2004, № 351 approved the "Rules for detoxification of pesticides (toxic chemicals)." For violation of this Regulation, the perpetrators are brought to administrative responsibility in accordance with the Code of the Republic of Kazakhstan "On Administrative Offences".

Local executive bodies of oblasts (cities of republican status, capital) carry out the following activities related to the use of pesticides:

1) organize the works for the detoxification of pesticides (toxic chemicals) in coordination with the state authorities in the field of environmental protection and public health;

2) build, look after and maintain the storages (repositories) in appropriate conditions;

3) license the activities on:

- manufacturing (formation) of "pesticides" (toxic chemicals);
- realization of pesticides (toxic chemicals);
- use of pesticides (toxic chemicals) in aerosol and fumigant ways.

Individuals and legal entities using pesticides in their activities must:

1) comply with the safety requirements in the field of pesticides (toxic chemicals), established by technical regulations;

2) conduct registration and production tests of pesticides (toxic chemicals) in accordance with the rules;

3) detoxify pesticides (toxic chemicals) and maintain special storages (repositories) in appropriate conditions.

Government Resolution of the Republic of Kazakhstan № 515 dated May 29, 2008, adopted a Technical Regulations "Requirements for safety of pesticides (toxic chemicals)." In accordance with the requirements of the Technical Regulations, pesticides (toxic chemicals) coming into circulation on the territory of the Republic of Kazakhstan should be registered by State and included in the list of pesticides (toxic chemicals), approved for use on the territory of the Republic of Kazakhstan. The order of state registration of pesticides is regulated by the Ministry of Agriculture of the Republic of Kazakhstan.

Import of POPs containing pesticides is banned in Kazakhstan since 1987.

Law of the Republic of Kazakhstan "On permissions and notifications" defines an exhaustive list of activities in the Republic of Kazakhstan, requiring a license. Regarding the management of chemicals it relates to the following activities subject to licensing:

- production, processing, purchase, storage, sale, use, and destruction of poisons;
- manufacturing (formation) of pesticides (toxic chemicals), realization of pesticides (toxic chemicals), use of pesticides (toxic chemicals) in aerosol and fumigant ways;
- manufacturing of medicines, production of medicines, wholesale and retail sale of medicines;
- collection (preparation), storage, processing and selling by legal entities of scrap and waste of ferrous and non-ferrous metals, except for the activities for realization of such scrap and waste generated by the entities in their own production and as a result of acquisition of property complex, which contained scrap and (or) ferrous (or) non-ferrous metals and waste, for the licensees.

As can be seen from the above list, manufacturing or import of hazardous chemicals in general are not subject to licensing, this requirement applies only to certain types of chemicals, namely to poisons, pesticides, toxic chemicals and medicines. It should also be noted that a license is required for the design of petrochemical, chemical industries, (technological) design of oil and gas processing industries.

1.2.5 Key approaches and procedures for POPs and pesticides management, including the provision of legislation and monitoring requirements

To increase the benefits and reduce the costs associated with the use of POPs, Kazakhstan is trying to control them through the development of appropriate policies, the adoption of laws, training and information dissemination. However, these efforts are not effective enough due to lack of political commitment, insufficient available resources, gaps in the legislation, poor inter-sectoral cooperation, weak enforcement of laws, lack of training, etc.

1.3. Evaluation of the POPs problem in the Republic of Kazakhstan

1.3.1 Evaluation of pesticides containing POPs

On the territory of Kazakhstan, there are over 21 mln *ha* of plough land and till 1990-ies the use of pesticides covered practically the whole of that area. Pesticides with POPs properties have never been produced in Kazakhstan, and currently they are not imported or exported and are not planned to be used in import and export in the future. However, significant quantities of previously produced POPs and used in the former USSR are accumulated across the most of the country.

With the reduction of agricultural lands in 2009 - 2013 (Table 6), the volumes of the use of chemical plant protection products have not reduced. The volume of introduced pesticides in a given period is within 8674.58 *kg/ha* - 10656.6 *kg/ha*. Pesticide load on the arable land is in the range from 0.41 *kg/ha* in 2013 to 0.18 *kg/ha* - in 2010. These may include pesticides related to POPs, subject to control under the Stockholm Convention on POPs.

Table 6 – Total volume of applied pesticides during the period of 2009-2013

№	Substance	Unit	2009	2010	2011	2012	2013
1	Total area of agricultural lands	1000 *ha*	36051,51	35858,63	36226,1	21494,8	21372,4
3	Insecticides – application	*tons*	352,05	289,52	449,2	410,2	632,4
4	Insecticides per unit area	*kg/ha*	0,01	0,01	0,01	0,02	0,03
5	Herbicides and desiccants – application	*tons*	7881,71	5702,85	9314,8	7719,7	7245,6
6	Herbicides, desiccants per unit area	*kg/ha*	0,22	0,16	0,26	0,36	0,34
7	Fungicides and bactericides – application	*tons*	414,1	233,22	853,4	426,6	509
8	Fungicides and bactericides per unit area	*kg/ha*	0,011	0,007	0,024	0,020	0,024
9	Total introduced volume (all pesticides)	*kg/ha*	8716,14	6283,85	10656,6	8674,58	8738,38
10	Introduction of pesticides per unit area	*kg/ha*	0,24	0,18	0,29	0,40	0,41

According to the Ministry of Agriculture of the RK, only those substances are imported to the country that are included in the "List of pesticides (toxic chemicals) permitted for use on the territory of the Republic of Kazakhstan for 2013-2022", approved by Order of the Minister of Agriculture №143 of 27.12.2012 and its annual additions. All pesticides (toxic chemicals),

specified in this List have to undergo state registration in accordance with the Law of the Republic of Kazakhstan "On Plant Protection". The List is subject to coordination with the competent authority in the field of environmental protection and the competent authority in health area.

The number of pesticides permitted for use in agriculture, currently has more than 900 titles. The overwhelming majority of applied pesticides are - insecticides, fungicides, and herbicides.

In the list of prohibited pesticides on the territory of the Republic of Kazakhstan, chlor-containing pesticides are distinguishable. Their list includes the following compounds: aldrin, dieldrin, DDT, heptachlor, hexachlorocyclohexane, polychloropinene, polychlorocamphene, etc.

In 1998, according to the Ministry of Agriculture, the Republic of Kazakhstan has accumulated 574 *tons* of obsolete pesticides and 50 thousand units of packaging containers. The main reasons for the accumulation of obsolete pesticides are:

- prohibition of already purchased products because of the increased toxicological or environmental hazard;
- long-term storage of pesticides with a short shelf-life;
- poor organization and keeping of records;
- expired deadlines.

During the inventory of obsolete pesticides, carried out in 2001 prior to signing the Stockholm Convention by Kazakhstan, the country revealed 621 *tons* of unusable products. Accumulated volume of persistent organic substances in the Republic of Kazakhstan was estimated at 15.5 *tons*. They are presented by toxaphene - 15 *tons* (North Kazakhstan) and DDT - 0.5 *tons* (East Kazakhstan oblast).

In 2001, Kazakhstan in the framework of the UNEP project for the first time conducted a preliminary inventory of obsolete, prohibited and unwanted pesticides, including persistent organic pollutants.

Specificity of the inventory carried out in 2001 was the fact that it was carried out through collection of information from oblasts, without visiting them. Information was requested through regional territorial department of the Ministry of Agriculture and the Ministry of Environment and included the following issues: the presence of pesticide warehouses and their technical condition; existing stocks of obsolete pesticides; the presence of pesticides with POPs properties; presence of packaging container from pesticide; existing and abandoned landfills and repositories of pesticides.

A preliminary inventory of pesticides requiring disposal in 2001 did not cover all regions of the country. In some areas, such as Aktobe, Pavlodar, Kostanai, significant stocks of prohibited, obsolete, expired, and other unusable pesticides were revealed in 2002-2003.

According to the Ministry of Agriculture in 2003 in Kazakhstan accumulated 41.68 *tons* of POPs containing pesticides (Table 7).

Table 7 - Results of the preliminary inventory of POPs out of the pesticides of the Republic of Kazakhstan (as of April 1, 2003, according to the Ministry of Agriculture)

№	Name of the pesticide containing POPs	Storage location	Amount, tons	Burial date
1	Toxaphene	North Kazakhstan oblast, Akkayin district, JSC “Plodorodie”	15,00	-
2	DDT	East Kazakhstan oblast, Zharma district, Zhangistobe village		2002
	TOTAL		15, 00	

According to the results of such work in 2001 Akmola oblast was allocated funds from oblast budget for the design and construction of the landfill, and in 2002 – for disposal of 84.91 tons of pesticides.

In 2002, 105 tons of unwanted pesticides were disposed (buried) in the East Kazakhstan oblast. The buried pesticides included 0.5tons of DDT, which belong to POPs.

Conducted inventories of obsolete pesticides do not reflect the true position, requiring a more detailed and serious evaluation of existing stocks of obsolete pesticides, which may include POPs-pesticides. Most of the identified obsolete pesticides during the inventory constitute a mixture of unknown composition, requiring identification. Mixtures of pesticides of unknown composition constitute 72.0% of the total number.

Organization works for the disposal of pesticides and packaging containers from them in Kazakhstan are carried out in accordance with the Budget Code of the Republic of Kazakhstan and is the responsibility of the local executive bodies and at the expense of the local budget.

According to the latest data from the Ministry of Energy for the month of April 2014, the total amount of obsolete pesticides stored at various sites in Kazakhstan has reached 1 617,637.75 *kg (liter),* with more than 169660 pieces of packaging containers from them (Table 8).

Recycling of packaging containers from pesticides remains a challenge due to insufficient capacity of processing enterprises and most of them are simply disposed of in existing repositories.

Table 8 – Quantity of obsolete pesticides and packaging from them by oblasts

Oblast	Obsolete prohibited, unwanted pesticides, kg(l)	Pesticide storage warehouses			Buried pesticides, кг(л)	Packaging, units.	
		Typical, units.	Adapted, units	Quantity of stored pesticides, kg(l)		Total quantity	Budget packaging
Akmola	1500 000	10	207	-	13020	39310	10009
Aktobe	0	2	39	-	0	2936	-
Almaty	0	-	-	-	3580	316	256
EKO	60331	6	67	-	16270	14435	8530
Zhambyl	0	3	-	-	-	0	0
WKO	0	2	6	-	11400	5414	5414
Karaganda	0	2	25	-	269 000	0	0
Kostanay	57306	9	224	533 498,8	823 493,0	54189	11018
Atyrau	0	1	-	-	-	420	420
Kyzylorda	0	-	-	-	-	-	-
Mangistau	0	-	-	-	-	-	-
Pavlodar	70	-	14	6213	120 000	625	625
NKO	0	1	203	-	-	9054	9054
SKO*	0,75	-	1	-	-	42961	31082
Total:	**1617637,75**	**36**	**786**	**539 711,8**	**1256 763**	**169660**	**76408**

** In southern Kazakhstan an inventory was conducted in 2013in the frames of GEF/FAO GCP/RER/035/TUR project: "Pesticides lifecycle management and disposal of POPs-pesticides in Central Asia and Turkey".*

With regard to potential storage sites of pesticides, there are two such objects in Kazakhstan, one warehouse is under the jurisdiction of "ECO-garant", located in the Akmola oblast (north), as well as a warehouse owned by "Sharua", located in Kostanai oblast (west from Akmola).

It should be noted that large amounts of obsolete pesticides were buried in landfill repositories in the 60-80-ies of the last century, and information on the location and quantity of pesticides buried is not available in the archives. According to data obtained from the population, the old storages exist in almost all regions of the country and it is possible to assume that such storages with unaccounted quantities of pesticides may exist. This indicates the need for a detailed inventory of landfill repositories, old abandoned warehouse, former airfields of agricultural

aviation, etc. It is necessary, moreover, to undertake identification of buried pesticides to determine the most appropriate environmentally sound technologies for the destruction of this category of waste.

The range, volume and condition of obsolete pesticides, the quality of packaging, repackaging volumes can only be determined during the detailed inventory. Along with the inventory of obsolete pesticides, it is necessary to determine the number of empty packages from products, accumulated with consumers in large numbers. Tara is a serious threat to the population, because it is often used for household purposes, to store food and water. Therefore, during the inventory it is necessary to consider both the number and types of empty packaging (metal, plastic, cardboard, etc.).

1.3.2 PCB evaluation

In respect of PCBs, the Convention sets forth three major goals:

- immediate elimination of new PCBs production
- elimination of operation of the PCBs-containing equipment by 2025
- early, no later than 2028, introduction of the environmentally sound PCBs wastes management.

PCBs stockpiles. There are no stockpiles of pure PCBs and oils based on them (sovol, sovtol and others) on the territory of the republic. Leftovers of trichlordiphenyl in Ust-Kamenogorsk capacitor plant and production wastes were buried in the accumulation pond of the plant in 1989-1991 .

PCBs-containing equipment

Transformers. According to the results of the preliminary inventory in the republic there are 114 transformers filled with sovtol produced by OJSC "Transformer" (town of Chirchik), 4 of which produced in France. There are 105 transformers at JSC "Mittal Steel Temirtau", 6 transformers at JSC "Atyrau oil refinery", 2 - at JSC "Ferrochrom" and 1 - at the entreprise of the water treatment plant of Ust-Kamenogorsk.

Capacitors. According to the preliminary results of the inventory in the republic there are approximately 50 thousand capacitors, of which about 15 thousand are buried in the Semipalatinsk nuclear testing site, over 23 thousand capacitor units are in use and 78 of capacitor installations with the unknown number of capacitor units in them filled with trichlorodiphenyl, mainly, produced in Ust-Kamenogorsk capacitor plant before 1990:

- 16,379 capacitors are installed at Aksu ferro-alloy plant and 310 capacitors at Aktubinsk ferro-alloy palnt and branches of the JSC TNC "Kazchrom";
- 4 capacitor installations and 1,450 capacitors with trichlorodiphenyl at JSC "KazZinc", of which 498 units are decommissioned and prepared for disposal;
- 444 capacitors at Ust-Kamenogorsk titanium magnesium plant;
- 811 capacitors with trichlorodiphenyl are decommissioned and stored in the storehouses of the power substations of the JSC "KEGOC" and only 9 units are in operation;
- 7 capacitor installations and 70 capacitors are installed at the enterprises of CJSC NAC "KazaAtomProm";
- 557 capacitors are on the balance of the CJSC NC "Kazakhstan Temir Zholy";
- 1,024 capacitors and 105 transformers with PCBs are in operation at OJSC "Mittal Steel Temirtau";
- 682 capacitors are at CJSC NC "KazMunaiGas";
- 211 capacitors are installed at OJSC "AZKHS";
- 124 capacitors at "KazPhosphate, Ltd";
- 23 capacitors with unknown content at State utility Company "Oskemen Water Treatment

Plant" of Ust-Kamenogorsk, 3 capacitors produced by UKCP are at OJSC "Kazakhmys" and 80 capacitors at "Altrade, Ltd" of East-Kazakhstan oblast;

- several units of capacitors or 2-4 capacitor banks are in operation in many enterprises of Karaga and West-Kazakhstan oblasts, each;

- in 2002, 14,865 capacitors with trichlorodiphenyl of UKCP production were dismantled from the electric power substation of Ecibastuz and buried in the Semipalatinsk nuclear testing site;

- about 15,000 capacitors were found in the former military base "Darial-U".

In the frames of the budget program for 2007-2009, the works have been carried out at the former military base “Darial-U” to dismantle and pack capacitors in accordance with the requirements of the Basel Convention for PCB-containing wastes. Three parties consisting of 10052 capacitors were removed and destroyed in Germany. The remaining 59 capacitors are still at the “Darial-U” storage.

In 2008, 348 capacitors were found at three electrical substations of Alatau Zharyk Company, and in 2011 the East Kazakhstan energy distribution company also announced that it has 467 capacitors.

A more complete picture on the number of PCB equipment will be formed after a detailed inventory of oil-filled equipment in accordance with the Rules for handling of persistent organic pollutants and wastes containing them.

The following sectors possess equipment:

- energy complex - over 2,5 thousand pcs;
- mining and metallurgical complex - about 20 thousand pcs;
- railroad transport - about 600 pcs;
- chemical industry - about 400 pcs;

The administrative regions have:

- Pavlodarskaya oblast - 31,244 pcs of capacitors;
- East-Kazakhstan oblast - 1 transformer, 1,977 pcs of capacitors and 34 capacitor units;
- Karaganda oblast - 105 transformers, 1,262 pcs of capacitors and 6 capacitor units;
- Aktobe oblast - 520 pcs of capacitors;
- West-Kazakshtan oblast - 351 pcs of capacitors and 2 capacitor units;
- Mangistau oblast - 323 pcs of capacitors;
- Zhambyl oblast - 290 pcs of capacitors;
- other oblasts - over than 2,000 pcs.

During the implementation of the joint project of the Ministry of Energy (the former Ministry of the Environment Protection) and UNDP/GEF "Design and execution of a comprehensive PCB management plan for Kazakhstan", 32 additional PCB transformers were revealed at Stepnogorsk Bearing Plant, 12 transformers at Kazakhmys, 2 transformer at Aksu ferroalloy plant, 2 transformers at the "East" coal mine. In autumn of 2013 PCB oil was drained from 33 transformers of four companies (ArcelorMittal - 25, Atyrau Oil Refinery - 4, Stepnogorsk Bearing Plant - 2, Kazakhmys - 2) into the UN-certified drums. The soil and the adsorbent contaminated with PCBs was also packed into similar drums, and 80 tons of PCB oils and waste were removed by aircraft and destroyed on July 2, 2014, in France at the "Tredi" Plant near the city of Lyon.

Within the framework of the earlier mentioned project "Design and execution of a comprehensive PCB management plan for Kazakhstan", 169 tons of PCB capacitors from six companies (coal department of ArselorMittalTemirtau - 288 pcs., East-Kazakhstan electricity distribution company - 333 pcs, Ust-Kamenogorsk Capacitors Plant - 4 pcs, Alatau Zharyk Company - 348 pcs and Aksu ferroalloy plant - 13 pcs) were packed and transported to the destruction in France in December 2014.

Other equipment. Other kinds of oil filled equipment have also been used in the country, such as oil-break switches, reactors, inputs, oil-flooded compressors, rectifying devices. According to the information of the Russian Federation in Soviet Union PCBs were not used in the above mentioned kinds of equipment (also confirmed by selected oil that of this equipment). PCBs can be found only in the analogous imported equipment in the country. It is necessary to randomly examine them for PCBs presence.

At the same time, Pavlodar chemical plant has produced soft cable and footwear materials based on polyvinyl chloride. The production was suspended starting from 1990s. PCBs were used as a heat-transfer liquid in the reactor heating system to produce polyvinyl chloride footwear and soft cable compound. The amount of the used PCBs was about 6m^3. Today existing stockpiles do not exceed 1.0-1.5 m^3. At present, there are no experts left who operated this production and it is unknown where missing PCBs are located. Since polyvinyl chloride in Kazakhstan is not produced and raw material for this production needs to be imported, the launch of the plant is unprofitable and economically impractical. The left-overs of PCBs and polluted equipment should be utilized.

Wastes containing PCBs. Decommissioned and dismantled equipment with PCBs and the layer of soil with PCBs spillage from the damaged equipment are deemed to be wastes containing PCBs. The soil layer should be removed and put into air-proof containers or bags.

At present, decommissioned and dismantled capacitors with PCBs are located in OJSC "KEGOC", OJSC "KazZinc" and other enterprises. 14,865 capacitors and 50 bags with soil from the electric power substation of Ecibastuz buried in the Semipalatinsk nuclear testing site and are considered to be wastes containing PCBs.

Another substation - "Central" - of Sarbaiski branch of JSC "KEGOC" (Kostanai) also dismantled 480 capacitors and store them in the open air near the fence on the substation territory. Leak traces can be noticed on many capacitors (they are covered with a layer of PCB-absorbed dirt) and near the storage of the capacitors there is a strong and persistent odor. The soil under the capacitors is also saturated with PCBs. In 2005, the capacitors and the soil underneath them were put into metal containers, sealed and taken to a temporary storage to the Rudnensk electric power substation "Sokol", which is situated in 10 km from Rudniy village in the steppe.

Other substations also have decommissioned capacitors. In Nikolsk substation (town of Satpayev) 480 capacitors were decommissioned but not dismantled. In Balkhash substation 600 new capacitors are stored on the territory of Balkhash branch, there are 70 capacitors assembled but not operated in Balkhash substation "KEGOC". 426 decommissioned capacitors are at the JSC "KazZinc".

1.3.3 DDT Evaluation

Chemicals of restricted use are listed in Annex B. Among them - DDT.

In respect of DDT the Convention stipulates:

- elimination of the production and use, except of cases for disease vector control,
- facilitation of scientific studies and development of safe chemical alternatives to DDT.

In Kazakhstan DDT was not produced. In the U.S.S.R. use of DDT was officially prohibited in 1971. All stocks of DDT used in agriculture were buried in 14 repositories. Information on the volume of dumped DDT were lost in 1990-ies years in connection with the liquidation of agricultural chemicals.

However, till 1990-ies DDT was used in Kazakhstan for veterinary and medical purposes. Small left-over amounts of DDT can still be found in the soil, plants and water, air of the work zone and foodstuffs.

1.3.4 Evaluation of releases of unintentionally produced chemicals

Dibenzo-p-dioxins and dibenzofurans, hexachlorbenzene and PCBs are unintentionally formed and released from thermal processess involving organic matter and chlorine as a result of incomplete combustion or chemical reactions.

Potential industrial sources of releases of unintentional POPs in Kazakhstan can be enterprises of practically all industrial sectors. The leaders are energy, ferrous and nonferrous metallurgy, chemical, petrochemical, pulp and paper and cement industries.

Energy

Energy complex of the republic is presented by the enterprises that extract fuel (gas, oil, coal) and produce electric power and heat (TTP, GRES, gas-turbine stations).

During oil and gas extraction according to the technology, a part of the extracted fuel is burned in the torches under high temperatures. Together with it, light fraction of hydrocarbons (methane, ethane) is burned but it does not form dioxins and furans. However, in the oil and gas deposits a significant amount of residual oiled wastes is formed, which can at random or involuntarily get inflamed. Combustion of such wastes is a source of releases of dioxins and furans.

54 stations operating on coal – potential sources of dioxins and furans belong to the energy-producing enterprises. An annual volume of the burned coal in the stations is 31,598.1 thousand tons.

Almost all stations provide purification of the released gases. However, technologies and equipment as well as level of purification and efficiency in different stations vary depending on the period of their construction and operation. There are stations built in 1940-80-ies. Many of them are obsolete: sometimes gas is purified on cyclones, sometimes - on electrofilters, and sometimes in gas scrubber. To prevent releases of dioxins and furans it is necessary to replace the operating equipment with new technologies (fabric filters, etc.).

Ferrous and non-ferrous metallurgy

Agglomeration sintering. In Kazakhstan the ferrous metallurgy is represented by the production enterprises: SC "Atasuruda", SSGPO. Agglomeration sintering is a potential source of release of dioxins and furans in the ferrous metallurgy. Amount of the produced agglomerate in the republic is 6,005.4 thousand tons.

Coke production. Another potential source of releases of dioxins and furans in the ferrous metallurgy is coke production. Coke in the republic is produced only by one enterprise OJSC "Mittal Steel Temirtau" from pit coal through heating without air access. Releases of dioxins and furans are possible only at the stages of unloading and extinction of coke. Unfortunately, these processes are carried out in the open air without special devices to entrap and purify the released gases. An annual volume of the coke production is 2,624.7 thousand tons.

Foundry production. In Kazakhstan pig iron and steel are produced in one enterprise - OJSC "Mittal Steel Temirtau". Foundry production exists in many enterprises of mining and metallurgical and engineering complex. An annual volume of the product in 2002 was: pig iron - 4,008.8 thousand tons, steel - 6,040.3 thousand tons.

Copper production. In copper melting plants of OJSC "Corporation "KazakhMyz" (Balkhash, Zhezkazgan and village Glubokoye in East-Kazakhstan oblast) purification of the released gases is provided with the purpose of getting sulfuric acid, and the dust entrapped from the gas that might contain dioxins and furans is sent for further processing to extract such valuable components as rhenium, osmium, selenium, etc.

Remelt copper production using copper scraps can form dioxins and furans in significant

amounts since copper is a catalyst of their formation. According to the data of the Ministry of Industry and Trade of the RK, there are no enterprises producing remelt copper in the country.

Many machine-building enterprises engaged in the foundry production of copper and its alloys, in particular, brass.

Aluminium production. There is no production of primary and secondary aluminium in the republic, but several enterprises produce cast aluminium.

Lead production. During the production of primary lead, releases of dioxins and furans are very small and are not listed in the register. Ust-Kamenogorsk lead and zinc combine - OJSC "KazZinc" and Shymkent lead plant are the only enterprises in the republic that produce primary lead.

Secondary lead smelting from lead scraps of chiefly lead fins for automobile accumulators is accompanied by formation of a significant amount of POPs when polyvinyl chloride parts of the accumulator get into smelting kilns. OJSC "Kainar" produces automobile accumulators and therefore smelts secondary lead. It is possible that secondary lead is smelted in small amounts by small enterprises (automobile bases, Ltd), but the information on them is not available.

Zinc production. Production of zinc from the dust and slags of other productions is carried out under high temperatures 1100-1200^{o}C under which formation of dioxins and furans is unlikely. Primary zinc is produced by several enterprises: OJSC "KazZinc", "NovoZinc" Ltd, and OJSC "Corporation "KazakhMys".

Smelting of secondary zinc out of scaps is carried out under 350-450^{o}C. Smelting of secondary zinc is possible in small enterprises but there is no information on them.

Brass and bronze production. Production of alloys based on copper under relatively low temperatures (up to 1000^{o}C) also can be accompinied by formation of dioxines and furans. ZOZM Ltd in Balkhash produces primary copper alloys. In addition, many machine-building enterprises cast brass and bronze in the small kilns that can be sources of dioxins and furans.

Magnesium production. Magnesium usually is produced through fused electrolysis of magnesium chloride which is produced by chlorine treatment of magnesium oxide under 700-800^{o}C together with coke . Electrolysis is carried out by graphite electrodes which also can be a source of dioxins and furans. In Kazakhstan magnesium is produced by the Titane and Magnesium Plant in Ust-Kamenogorsk.

Production of construction materials

Lime production. Formation of dioxins and furans is possible during limestone burning in shaft kilns. In the republic lime is produced in Temirtau Chemical and Metallurgical Plant, Ltd in the shaft kiln.

Brick production. Various types of clay and fuel are used during brick burning. Burning of raw brick is carried out in the ring or tunnel kilns, where there is no contact between the burning gas and brick. Fuel is burned separately and releases of dioxins and furans subject to complete gas combustion and quality of released gases purification. In some cases, gas purification is minimal or there is none at all. In soviet times, almost every town had their own brick plants, but the majority of them were liquidated during the economic crisis. At present, some of them are tried to be launched back to the operation but their functioning is unstable.

Asphalt-concrete production

Preparation of asphalt can be a source of dioxins and furans. Small plants producing asphalt exist in many oblast centers.

Textile production

According to the information received from the akimats, chloranil and pentachlorophenol - sources of dioxins and furans - are not used in the enterprises of light industry of Kazakhstan.

Residential heating and meal preparation

The majority of private households in the country are heated with coal. At present, accurate information on quantity of the households and volumes of burned fuel is not available.

Open waste incineration

All forms of open incineration are used in Kazakhstan. Use of the best techniques and ecological practice in these issues is the key to solution of social problems of the local communities and their democratization.

Solid household wastes

In Kazakhstan there are no operating waste processing plants. Solid household wastes are stored in the open grounds near settlements. There is no data on volume of stored wastes in the urban and industrial dumps. Spontaneous combustion takes place in many of them. There is no data on fires at the household waste dumps.

Hazardous wastes

Hazardous wastes of the industrial enterprises in Kazakhstan are stored in the special industrial grounds. Specific requirements of their burial are applied in accordance with GOST and controlled by oblast sanitary and epidemiological stations and territorial environmental departments. Incineration of hazardous wastes is not carried out due to the lack of appropriate techniques and high cost of incineration. There is spontaneous combustion on the dumps.

Medical wastes

Medical wastes are formed practically in all treatment-and-prophylactic establishments of the republic. Utilization of medical waste is carried out by various ways from autoclaving to burning in small furnaces, the significant part is simply taken out to municipal waste sites or dumps

Incineration of wood and biomass wastes. During the soviet regime, almost every oblast in Kazakhstan had wood-processing enterprises. Many of them are liquidated by now. Survived enterprises operate very unsteady and there is no data on their wastes.

Incineration of sewage sludges is not carried out in Kazakhstan.

Biomass combustion

There are cases of biomass combustion. These include cases of forest and steppe fires

Incineration of wastes and spontaneous fires

The authorized body in the field of natural and man-made disasters have information on the number of fires in Kazakhstan, but there is no data on the volume of burnt materials.

Biomass drying. At present there is no data on this category.

Crematoria. There are small animal carcasses crematoria in the country but there is no accurate data on their quantity and location.

Smokehouses. Majority of meat-processing plants that operated in the republic during the soviet era are dissolved. Nowadays small enterprises operate on their basis. Information available, unfortunately, does not cover all these enterprises.

Leftovers of dry cleaning. At present, many small enterprises providing dry cleaning services operate in the republic, but there is no information on their quantity, location and amount of used degreasing solvents and their wastes.

Tobacco smoking. In the republic there are 2 branches of renowned cigarette producers: Philip Morris (Almaty) and Galaher Kazakshtan (Symkent). in addition, a large amount of cigarettes is imported to the country.

Wastewater/sewage treatment. Wastewater of many enterprises in the republic undergoes special treatment and later dumped into the specially dedicated accumulation ponds. Nevertheless, there are cases of dumping of untreated wastewater into a city sewage system or into small open water basins. There is no data on dioxins and furans content in the sewage.

Dumping into open water basins. Dumping of wastewater into open water basins is carried out upon appropriate treatment and in compliance with GOST and controlled by the sanitary and epidemiological stations. There is no data on dioxins and furans content in the treated dumping water.

Composting. At present there is practically no composting for the agricultural purposes. There are few cases of composting in dacha.

Oil waste treatment. Processed oil officially is not treated and it is dumped into industrial waste grounds. There is no data on volume of the used oil.

Preliminary level of releases of dioxins and furans in Kazakhstan in 2002 is estimated at 340 *g-TE per year*. Releases of dioxins and furans in certain sectors are shown in Table 9. This figure is obtained by calculation according to the technique developed by UNEP Chemicals "Methodological Guidance for Identification and Quantification of Dioxin and Furan Releases" prepared in 2001.

Table 9- Releases of dioxins and furans in selected sectors of economy

Sector	Annual releases, g-TE/year				
	Air	Water	Soil	Fly ash	Sludge
Production of power and heat energy	315,981	0,000	0,000	0,000	0,0
Production of ferrous and nonferrous metals	3,324	0,000	0,000	0,000	9,1
Production of goods of mineral raw materials	17,819	0,000	0,000	0,000	2,1
Uncontrolled processes of incineration	2,829	0,000	0,051	0,000	2,7
Production and use of chemicals and consumer goods	0,000	0,000	0,000	2,845	0,0
Other	0,002	0,000	0,000	0,000	0,0
Total	340,0	0,0	0,1	2,8	13,9

Figure equalled to 340 *g-TE/year*, is clearly underrated because the data on incineration of the medical wastes, dump fires, unsanctioned waste incineration in the enterprises and households (i.e., on those categories that produce the most release of dioxins and furans) was not included into the calculations.

1.3.5 Evaluation of new POPs

The majority of the new POPs are included in the list in Annex A to the Stockholm Convention, which means – the Parties shall take measures to eliminate the production and use of chemicals. And while many of these substances have been excluded from the production and use, however, they are still present as a byproduct.

Sectors using the new POPs are as follows: agriculture, pharmaceuticals, production of construction materials, production of electronics and electrical engineering, mechanical engineering, furniture, textiles, packaging, chemical industry.

Agriculture. The following new POPs could been used in agriculture: alpha and beta hexachlorocyclohexane, lindane, chlordecone and endosulfan.

Alpha- and beta-HCH and lindane were never produced in Kazakhstan, but could been imported, therefore, may be in the warehouses of obsolete pesticides. According to the Ministry of

Agriculture, HCH was never applied in the territory of Kazakhstan.

Chlordecone is a synthetic chlorinated organic compound, which is mainly used as an agricultural pesticide. It was first produced in 1951 and introduced commercially in 1958. It is widely used in the tropics for the control of banana Black Leg. It was also used as a larvicide, and fungicide for the control of Colorado potato beetle and Halovit mites. Chlordecone was used in homes to control ants and roaches. Currently no information is reported on the use or manufacture of the chemical. Chlordecone was not produced in Kazakhstan and, most likely, was not imported.

Endosulfan - an insecticide that has been used since the 1950s to control crop pests, tsetse flies and ectoparasites of cattle, as well as a wood preservative. Endosulfan is currently used as a broad-spectrum insecticide to control a broad spectrum of pests of different crops, including coffee, cotton, rice, sorghum and soybeans. The use of endosulfan is banned or will be stoped in 60 countries, representing 45% of the current global use. Endosulfan is not produced in the Republic of Kazakhstan and according to the Ministry of Agriculture has never been used.

Production of electronics and electrical equipment. In the manufacture of electronics and electrical equipment, hexabromobiphenyl and pentachlorobenzene are mainly used.

Hexabrombiphenyl - is an industrial chemical that is mainly used as a flame retardant in acrylonitrile butadiene styrene (ABS) thermoplastics for constructing business, in machine housings, in industrial and electrical products and in polyurethane foam for auto upholstery. According to available information, it is no longer produced and not used in most countries.

Pentachlorbenzene was used in dyestuff carriers, as a fungicide, a flame retardant and as an intermediate chemical, for example, previously for the production of quintozene. PeCB can still be used as an intermediate product. PeCBs are unintentionally produced and released into the environment by incinerator plants, from the burning of household waste, pulp and paper mills using chlorine bleaching, steel mills, oil processing enterprises and enterprises with activated sludge wastewater treatment. It was discovered as an incidental impurity in several pesticides, including pentachloronitrobenzene, atrazine, chlorothalonil, cottage, lindane, pentachlorophenol, picloram and simazine.

Engineering sector widely uses octabrombiphenyl ether and pentabrombiphenyl ether.

Octabrombiphenyl ether is used primarily in acrylonitrile-butadiene-styrene (ABS) polymers. A slight amount of this compound (approximately 5%) is used for the production of high impact polystyrene (HIPS), polybutylene terephthalate (PBT) and polyamide polymers. Refractory polymer products are typically used for the housings of office equipment and business machines. In addition, reports on the use of octabrombiphenyl ether for the manufacture of nylon and low density polyethylene, polycarbonate, phenol-formaldehyde resins, unsaturated polyesters, and adhesive (adhesive) and protective coatings.

The main application area of pentabrombiphenyl ether is the production of polyurethane - this foam product can contain from 10 to 18 percent of a mixture of p-penta-BDE. Polyurethane foam is mainly used in the manufacture of furniture and upholstery in domestic furnishing, as well as in the automotive and aviation industries. It is also included in the rigid polyurethane elastomers in instrument casings, epoxy and phenolic resins (used in electrical and electronic equipment) and building materials. It is also used in packaging and non-foam packaging materials and electronic equipment. It is used in specialized applications and in the textile industry.

Light industry.

Perfluorooctane sulfonate is both an intentionally produced and an unintentionally produced degradation product of related anthropogenic chemicals. PFOS and related chemicals are used or have been used in the manufacture of: fire fighting foams, carpets, leather garments, textiles, upholstery fabric, paper and packaging, paints, cleaning products for use in industry and the home, pesticides and other insecticides, photographic industry, photolithography and semiconductor manufacturing, hydraulic fluids, and metal plating. PFOS is still produced in some countries.

However certain POPs can be used in various industries. For example, lindane is used both

in agriculture and in the pharmaceutical industry, pentabrombiphenyl ether is used in a number of industries - electronics and electrical engineering, building materials, furniture and textile industries and others.

Table 10 presents the main application areas of the new POPs and products in which they are used or can be used.

Table 10 – Application areas of new POPs

№	POPs name	Sector	Production / process
1.	Alpha- and beta-hexachlorocyclohexane	Agriculture	Pesticides (not used in the RK)
2.	Lindane	Agriculture Pharmaceutics	Broad-spectrum insecticide which is effective for both agricultural and non-agricultural purposes: - seed and soil treatment - wood treatment; - control of external parasites of animals and humans. As the pesticide was not used in the RK
3.	Chlordecone	Agriculture	Insecticide: - control of banana root borer - fly larvicide - fungicide against apple scab and powdery mildew - control of colorado potato beetle and rust mite on non-bearing citrus - control of potato and tobacco wireworm on gladioli and other plants - control of leaf-cutting insects - traps for ants and cockroaches Was not used in the RK
4.	Endosulfan	Agriculture	Insecticide: - processing of cotton, corn, oilseeds and vegetables, mushrooms, olives, hops, sorghum, tobacco, cocoa, tea, coffee, soybeans, rice, sugar cane, hazelnut, beans, fruit and berry crops - veterinary insecticide to control ectoparasites on meat and dairy breeds Was not used in the RK
5.	Hexabromobiphenyl	Construction Materials Electronics and electrical engineering	Is used as a fire retardant in three main commercial products: - acrylonitrile-butadiene-styrene (ABS) - thermoplastics for the construction of buildings, industrial and office equipment (eg motor housing), and electrical products

		Mechanical engineering	(eg, radio and TV); - fire retardant coatings and lacquers; - production of polyurethane foam for auto upholstery
6.	Octabromodiphenyl ether	Light industry Mechanical engineering	- fireproof plastic products - used in acrylonitrile-butadiene-styrene polymers (ABS) - partial production of high impact polystyrene, polybutylene terephthalate (PBT) and polyamide polymers
7.	Pentabromodiphenyl ether	Electronics and electrical engineering Mechanical engineering Construction Materials Furniture Textile Packaging	- computers, consumer electronics, office equipment, home appliances and other products with the schemes, plastic outer casings and internal plastic parts; - cars, trains, aircraft and ships containing electrical components and interiors of fabrics and plastics; - foam fillers, insulation boards, foam insulation, wall and floor panels, plastic sheeting, etc .; - upholstered furniture, furniture covers, mattresses, flexible foam; - curtains, carpets, foam sheeting under carpets, tents, tarpaulins, work clothes and protective clothing; - packaging materials based on polyurethane foam.
8.	Perftorooctane sulfonat	Textile Chemical Industry Light industry	- extinguishing foam - carpets - skin / clothing - textiles / upholstery - paper and Packaging - coatings and additives - industrial and household chemicals - polishes for floors - cleaning dentures - shampoos - photographic - anti-erosion agent - anti-reflective coating - surfactant - hydraulic fluids - metal plating
9.	Pentachlorobenzene	Electronics and electrical engineering Agriculture	- used in some old electrical equipment - was used as a chemical intermediate in the production of pentachloronitrobenzene (quintozene) and stored in the form of an impurity in this fungicide.

Thus, the application areas of chemicals that have been recognized as POPs are fairly broad and include agriculture and various industries.

Up to date it is found that in Kazakhstan there is air pollution with lindane. It was discovered in the framework of the project of the Regional Centre for POPs in Brno (head Ivan Holoubek) on monitoring of the atmospheric pollution with POPs, which was completed in 2009. Observation points of air pollution in Kazakhstan in 2008 were located in Ust-Kamenogorsk (2), Pavlodar (1), Karaganda (1), Temirtau (1), Balkhash (1), Borovoe (1), Atyrau (1). Total 8 points.

Considering that lindane falls under new POPs and the territory of the Republic of Kazakhstan is contaminated with this substance, it can be assumed that in Kazakhstan there are sources of POPs pollution, which result in the release of POPs into the environment.

Given the lack of complete and reliable data to monitor new POPs in the environment and in the finished products, it is impossible to reliably estimate the amounts of emissions of POPs into the environment in Kazakhstan.

It is known that chemicals recognized as persistent organic pollutants by Stockholm Convention in 2009 and 2011, are not produced or manufactured in the Republic of Kazakhstan. However, in Kazakhstan has a high share of imported products that could potentially have new POPs from countries: US, EU, India, China, Russian Federation. In addition, during the Soviet Union, the Republic of Kazakhstan freely received products containing POPs.

It is known that in the Soviet Union chlorinated organic pesticides were produced mainly in Dzerzhinsk and Chapayevsk. Table 11 presents general information about the volumes of production of pesticides, which were recognized as POPs-containing, in 2009 and 2011.

Table 11 – Production of pesticides containing new POPs in the USSR

№	Pesticide name	Production in USSR, years	Production for all years, tons
1	Hexachlorobenzene	1967-1993, Dzerzhinsk, Chapaevsk	37 000
2	Chlordecone	Was not produced	-
3	Pentachlorobenzene	Was not produced	-
4	Lindane (gamma-hexachlorocyclohexane))	Was produced as part of the technical and enriched HCH	-
5	Alpha hexachlorocyclohexane	Was produced as part of the technical and enriched HCH	-
6	Beta hexachlorocyclohexane	Was produced as part of the technical and enriched HCH	-

Thus, *hexachlorobenzene* was used as a fungicide. HCB has also been used as an industrial chemical. HCB has been permitted for use for agricultural purposes in forestry and municipal services until 1990 as a component of *hexatiuram* and *gammahexan* products. Hexatiuram was used as a fungicide for seed crops produced in the form of a wettable powder (80% active ingredient) and a mixture of 30% and 50% hexachlorobenzene thiuram (tetramethyl). Gammahexane was used as insecto-fungicide and presented a mixture of 30% to 20% of hexachlorobenzene and lindane (gamma-HCH). In the 1990-1996 period permitted was only the use of hexatiuram and gammahexane residues from the application in the preceding period. After

1996 Russia prohibited the use of any preparation containing HCB as a pesticide

Chlordecone was neither produced nor used in the USSR.

Pentachlorobenzene was used as a pesticide and flame retardant, as well as with PCBs in dielectric fluids in electrical equipment. It was used as an intermediate for the production of pesticide pentachloronitrobenzene (quintozene). In the USSR pentachlorbenzene was not produced.

Lindane was used as an insecticide. Directly lindane was not produced in the USSR, but technical and enriched HCH was produced in Chapaevsk town of Samara region. After 1990, production was stoped.

Alpha-hexachlorocyclohexane and *beta-hexachlorocyclohexane* are the isomers of lindane that are formed as waste during its production. For every tonne of produced lindane, up to 8 tons of these isomers were produced. Alpha and beta-HCH is part of technical and enriched HCH and, respectively, part of preparations made form them, though not exhibit specific insecticidal properties.

Other chemicals recognized as POPs in 2009 and 2011 were not produced in the Soviet Union, but were imported as part of industrial products and consumer goods.

It is obvious that some of the products containing new POPs entered the territory of the Republic of Kazakhstan during the Soviet Union, some products came after 1991 and may continue to enter the market of Kazakhstan at the moment. Part of products containing POPs, continues to be used in Kazakhstan, and some - taken out of use and form mixed wastes production and consumption of POPs. This kind of waste is stored mainly in landfills for storage of solid waste or in regular landfills, or unauthorizedly burned.

Quantitative evaluation of new POPs on the territory of the Republic of Kazakhstan requires a careful analysis of the data of Customs Control Committee, Ministry of Agriculture, Ministry of Investment and Development, Ministry of Energy and others.

International experts developed a methodology for the inventory of new POPs, based on data on the volume of products that could potentially contain new POPs, indicators of the industry using new POPs and other parameters. The experts are facing a great job of detailed inventory of new POPs.

1.3.6 Data on awareness of stockpiles, polluted areas and wastes

There are six "hot spots" polluted with PCBs revealed in:

1. *Territory of Ust-Kamenogorsk capacitor plant (UKCP).* Till 1989 in UKCP capacitors were filled with trichlorodiphenyl. In 1989 a republican commission of the Ministry of Health of Kazakh S.S.R. was working in the plant. The Commission prohibited the use of trichlorodophenyl and developed an action plan on rehabilitation of the plant territory. Left-overs of trichlorodiphenyl (about 6-9 t) and contaminated soil were removed from the plant territory, taken to accumulation pond and buried there. The production technique was redirected to the saturating agent DOF produced in Japan. Documentation on decision of the commission and implemented activities is not available in the enterprise. Although rehabilitation activities were carried out in 1990-1991, the results of soil samples taken from the territory of the plant and closely located Ablaketka village show that PCB content in the soil is still very high. On the territory of the plant the PCBs content is 1,730 *mg/kg* and on Irtysh bank - 7-4 *mg/kg*, when mac is 0.06 *mg/kg*

2. *UKCP accumulation pond*. Left-overs of trichlorodiphenyl and layer of soil removed from the plant territory during the rehabilitation works were placed in the plant accumulation pond (according to the words of the personnel of the plant, the volume was about 6-9 *t*). Analysis of the soil layer from the beach and water of the pond showed that the PCBs concentration is 12,438 *mg/kg* and 0.19 *mg/kg* respectively. TheWorld Bank in the frames of its project on cleaning up the groundwaters of Ust-Kamenogorsk has conducted drainage of the pond by cleaning of the aqueous

phase using membrane technology. A concreted reservoir was created on the territory of the pond, which collected all of the sediments.

3. *Territory of the power substation in Ecibastuz*. Construction of the substation began under the soviet system with the purpose of transferring power energy produced in Ecibastuz TPP to the european regions of Soviet Union and countries of the Council for Mutual Economic Assistance. The task of the substation was to rectify alternating current into constant current. For these purposes it was planned to use capacitor batteries. By the moment of the Soviet Union collapse, about 15 thousand capacitors were assembled in the open areas of both sides of the rectifying substation. During the economic crisis, the population broke and unsealed many capacitors in order to get nonferrous metals - copper bars. In 2001, an emergency commission was established in Ecibastuz to eliminate the ecological threat for the population and the environment due to trichlorodiphenyl evaporation (near the dacha area and Irtysh-Karaganda canal). During the liquidation works in 2002 a new owner of the substation dismantled and sealed capacitors with a sealing foam. Part of soil with trichlorodiphenyl spillage was removed and packed into bags. Later, the capacitors and the bags with soil were taken to and buried in the Semipalatinsk nuclear testing site area. But the range of the activities was not complete. The soil under the docks on which the capacitors were installed has not been removed. PCBs concentration under the dock poles reaches 26,200 *mg/kg*, therefore it is necessary to dismantle the docks and remove the soil layer and bury it on a temporary basis; either in the closed building or in the Semipalatinsk testing site area till the decision on its utilization is taken.

4. Workshop for production of soft cable and footwear in the Pavlodar chemical plant.
5. Sites of former military bases in Northern Balkash territory.
6. Site of the power substation in Kostanai.

Due to the novelty of the issue, Kazakhstan does not have appropriate regulations, methodological guidelines, and measures on improvement of the situation.

1.3.7 Current programs of monitoring of releases and impact on human health and the environment, including outcomes

In Kazakhstan an issue of the POPs releases monitoring is extremely urgent. Scientific or applied works on unintentional POPs releases (dioxins and furans) have never been conducted.

Monitoring of environmental pollution of the Republic of Kazakhstan is conducted by the state environment observations network of "KazHydroMet" RSE - subordinate organization of the Ministry of Energy. Monitoring data are published in the periodical review of the state of the environment as a result of observations of the monitoring network.

Depending on the objectives and scope of environmental components, the environmental status monitoring system includes:

- air monitoring – determined over 17 pollutants are identified, including: particulate matter (dust), sulfur dioxide, carbon monoxide, nitrogen dioxide, hydrogen sulfide, phenol, formaldehyde, ammonia and others
- monitoring the state of precipitation and snow cover – the following are identifined:
  - - Anions - sulfates, chlorides, nitrates; bicarbonates;
  - - cations - ammonium, sodium, potassium, calcium, magnesium;
  - - minerals - lead, copper, cadmium, arsenic;
  - - acidity;
  - - electrical conductivity.
- monitoring the quality status of surface waters - more than 40 physical and chemical parameters of water quality are determined (ammonia nitrogen, particulate matter, hydrocarbons, sulfates, chlorides, calcium hardness, magnesium, sodium, potassium, total iron, silica, manganese, copper, petroleum products , nitrate, nitrite, pH, dissolved oxygen, odor, biochemical

oxygen demand (BOD5), Chemical Oxygen Demand (COD), phenols, total phosphorus, conductivity, fluoride, synthetic surface-active compounds (surfactants), thiocyanates, cyanides, zinc, chromium and others).

- monitoring of the soil condition - defines the content of heavy metals (lead, zinc, cadmium, copper, chromium)
- background monitoring - one integrated background environment monitoring station (IBMS) "Borovoe" is organized in Kazakhstan in Akmola region in order to obtain background information on the state of pollution of the biosphere and trends.

In addition, the RSE "Kazgidromet" conducts radiation monitoring and monitoring of transboundary watercourses.

Identification of POPs chemicals in the environment is carried out by "KazHydroMet" RSE only at one station - IBMS "Borovoe". From 2008 to 2010 the former Ministry of Environment and Water Resources of Kazakhstan in the framework of the EMEP program has installed new equipment for the IBMS post. Since July 2009, the IBMS monitors POPs in the components of the ecosystem. However, there is no full picture of POPs contamination in Kazakhstan.

According to the Environmental Code of the Republic of Kazakhstan, the nature users are required to carry out an industrial environmental control, an element of which is the production monitoring.

The main purpose of production monitoring is to obtain reliable information about the impact of the activities of the enterprise facilities on the environment, changes in their status as during normal (faultless) activity, and as a result of emergency situations.

However, the list of substances for which the production environmental control and monitoring is carried out is limited and does not include POPs.

Only within the framework of reporting on hazardous waste to the authorized body in the field of environmental protection the companies provide information on waste containing polychlorinated biphenyl, polybrominated terphinyl, polybrominated biphenyl (as well as any polybrominated analogues of these compounds).

According to figures for 2013, the enterprises of Kazakhstan formed 662.812 tons of such waste. Enterprises are not taking any measures to recycle and dispose of this waste, and they continue to accumulate then on the premises. On January 1, 2014, 818.395 tons has been accumulated at the enterprises of the Republic of Kazakhstan.

The system for management of chemicals in finished products in Kazakhstan is virtually nonexistent. The legislative framework in the field of chemicals management in Kazakhstan consists of a number of legal acts, the main of which is the Law "On safety of chemical products." The law establishes requirements for risk assessment of products, its registration in the authorized body and provision of material safety data sheet, which contains full information about the risks of use of the product and the safe management measures. For the registration procedure of chemical products, in accordance with established rules it is necessary to carry out sanitary-epidemiological, toxicological, environmental impact assessments and examination of industrial safety.

However, there is no control over the implementation of legislation in the field of chemical safety. This leads to the fact that legal requirements are not met. In 2013 in Kazakhstan there were only 320 material safety data sheets on 61product type (as of 03/05/2013).

This situation leads to the fact that in Kazakhstan’s market there is circulation of chemicals that have not been registered by the authorized body and have no material safety data sheet. Often such products contain hazardous chemicals, including those related to persistent organic pollutants.

In addition, the identification and monitoring of hazardous chemicals, including persistent organic pollutants in consumer goods (toys, kitchenware, packaging, paints, cosmetics, etc.) is completely absent. In technical product documentation there is usually no requirements for certain

hazardous chemicals with properties of persistent organic pollutants. Accordingly, there is no complete picture in terms of the use of products containing POPs.

The data obtained in the framework of the UNDP/GEF project "Initial Assistance to the Republic of Kazakhstan on fulfilling obligations under the Stockholm Convention on POPs," will be the basis for monitoring, although measurements of their content in foods and biological substrates were not carried out.

With the financial assistance of the project, in 2005 the Bashkortastan Republican Scientific Ecological Center carried out the first analysis of tests on dioxin and furan content in Kazakhstan.Their toxic isomers were identified in 6 samples of the air selected mainly in working places of the metallurgical enterprises and 7 samples of city soil and scrapes from the walls of the workshops.

1) Dioxins in the air of the working places

PCDD/PCDF content in the samples of air of the working places is high in the copper smelting workshop of the mining and metallurgical combine in town of Balkhash (over 4 *pg/m*^{3}), near the sintering machine in the plant "Mittal Steel Temirtau" (about 4 *pg/m*^{3}) and in the machine-building plant in Karaganda (about 2 *pg/m*^{3}), since it is 8 and 4 times respectively higher of maximum allowable concentration in the air - 0.5 *pg/m*^{3}. On the edge of allowable concentration are the working conditions in hydrometallurgical production of the JSC "KazZinc".

Low concentrations found in coke and chemical production of the "Mittal Steel Temirtau" are explained by the technological specifics of the production connected with high concentration of coal dust in the air that absorbs PCDD/PCDF. However, this does not exclude a long-term pollution of the territory near the coke kiln batteries, the level of which can be revealed by the analysis of soil or dust.

Air of the sanitary zone of JSC UKTMC in Ust-Kamenogorsk fully meets the norms of other countries (USA -0.02, the Netherlands - 0.024, Italy - 0.04 *pg/m*^{3}) in respect of dioxin pollution.

2) Dioxins in the dust of industrial enterprises

The results received for the polluted air of the working zone of the metallurgical enterprises were confirmed by the analyses of dust from the workshops wall scrapes. As shown in Table 12, the highest figures on the current air flow correlate with the data on long-term pollution (dust). Combined impact of both aerosols and dust particles, emission of PCDD/PCDF, especially in summer, on workers can cause accumulation in bio-tissues. Utilization of this dust during cleaning in the workshops requires the same type of management as with wastes of Hazard Class 1 and observance of special measures on safety of the workers. It is obvious that the wastes of these enterprises can also be a source of environmental and population pollution.

Table 12- CDD/PCDF concentration in the air samples, TEQ, pg/m3 and dust (wall scrapes)

Place of sampling	**Air, *pg/m*^{3}**		**Dust, *pg/g***	
	Concentration	**TEQ-WHO**	**Concentration**	**TEQ-WHO**
Mining and metallurgical combine, copper smelting workshop, Balkhash	51,33	4,08	5377,06	263,78
Machine-building plant, Karaganda	17,8	1,84	46,12	4,06
Plant "Mittal Steel Temirtau", sinter machine в„– 5, Temirtau	42,64	3,77	5419,7	607,7
"KazZinc", hydrometallurgical production, Ust-Kamenogorsk	6,33	0,47	289,35	19,83

A proof of high exposure of the workers of these workshops to dioxins can be an analysis of their concentration in the blood. These data can be a basis for measures to improve labour conditions in the plants.

3) Dioxins in the city soil

It is known that the main way of PCDD/PCDF entry into soil are through pollutants in the releases of combustion products of the industrial, household wastes and hospital furnaces. The major ways of destruction of PCDD/PCDF are photodegradation and evaporation, vertical migration is not significant, especially in soil with a high content of organic carbon. According to different data, PCDD/PCDF degradation time in the soil (semi-decomposition period) is 10-50 years in the depth and 1-10 years on the soil surface (up to 0.1 cm) and depends on its characteristics and climate conditions. It is proven that octa-chlorinated isomers are subjected to photodechlorination to a higher extent than low-chlorinated isomers. Presence of the organic solvents increases PCDD/PCDF penetration into the soil due to the lighter transport.

It is stated that the soil cover pollution depends on the level of development pressure and greatly varies. Figures for the environmental levels are the following: for the Northern America - 7,96 B±5,7 *pg* TEQ/g (number of tests, n=95) and for Europe - 8,69B±4,7 *pg/g* (n=133) (USEPA, 1994). Usually, the isomers with high chlor content dominate in the isomeric spector. PCDD/PCDF concentration in the urban zone is higher than in rural areas. An approximate safe impact level (ASLI RF) of PCDD/PCDF content in the soil is 0.33 *pg/g*, norms of dioxin content in agricultural areas in European countries are significantly higher - 5 *pg/g* (Italy), 10 *pg/g* (Netherlands, Germany). It is known that level of 9 *pg/g* is often registered on the territories of the European industrial cities, however for Russia, as a rule, it is a very high level of pollution, an average level is 1-3 *pg/g.*

Obtained figures for the soil taken in 1-3 km from the Balkhash industrial zone are less than 1 *pg/g*, which shows the absence of active air pollution from the chimneys of TPP and the plant. At the same time, the figure of soil pollution within the city in the Central park, exceeds 6 *pg/g* and can speak of the presence of local sources: leaf burning and from the residential chimneys and vehicles.

Today in Kazakhstan there is no comprehensive monitoring of POPs, including new POPs, in the environment and products. Requirements for the management of POPs is not fully implemented in the legislation of the Republic of Kazakhstan. Accordingly, there are insufficient measures for the identification and monitoring of POPs in the environment and the finished product, as well as of the impact of POPs on human health and the environment.

1.3.8 Summary of future production, use and releases of POPs (requirements for exemptions)

Not being a POPs producing country, Kazakhstan has no grounds for entry in the Register of specific exemptions. The corresponding letter on behalf of the Ministry of Health has been sent to the Secretariat of the Stockholm Convention on POPs in 2004.

Kazakhstan also has no drounds for the exclusion of DDT. DDT is not produced in the Republic of Kazakhstan, is not imported and exported. DDT stocks of are buried in the landfill repositories.

1.3.9 Current level of information, awareness and education

The issue of POPs, especially the industrial ones, is relatively new for Kazakhstan. Representatives of the legal and executive bodies, industrial circles and people at large know little about what are POPs, how they are formed and what danger they pose for human health.

In Kazakhstan, there are several organizations that provide training on Persistent Organic Pollutants. However, these training sessions are not held on a regular basis at intervals 1-2 times per year.

Thus, promotion of the public awareness on POPs issue and involvement of its most active groups in addressing of the problem is extremely important.

With the assistance of the international organizations and, first of all, UNEP Chemicals, UNIDO, UNDP, international network on POPs, NGO "Ecoaccord", and others, the mechanism of information exchange with other Parties of the Convention is well developed and acting.

1.3.10 Appropriate activities of the non-governmental parties concerned

Non-governmental sector of the Republic of Kazakhstan works actively in the field of implementation of the commitments of the Republic of Kazakhstan under the Stockholm Convention.

In particular, within the framework of the implementation of projects with participation of international organizations, the non-governmental concerned parties carried out the following activities:

- public information through organization and carrying out of informational activites and campaigns;
- establishment of resource centers provided with information on POPs, with open access to all parties concerned in the regions;
- lectures in the educational institutions read by attracted experts;
- articles in the specialized popular and scientific magazines;
- seminars for teachers of chemistry, biology, geography, valeology, and nature science;
- organization of an information campaign (distribution of booklets, flyers, skits on POPs);
- movies, advertising videoclips, themes in the ecological programs;
- newspaper articles of general character with specific examples of POPs location and ways of the problem solution;
- development of the educational module for teachers. Development and implementation of informational and educational programs at the national level.

1.3.11 Impact of POPs on human health and the environment

Ecological and hygiene studies confirm the results of the experimental works about the negative impact of POPs on the reproductive health, except, in the agricultural areas it is connected with pesticides impact and in the industrial - with the releases of dioxins and PCBs.

Therefore, two objects (as models) were selected to evaluate the POPs threat for the human health. They are: Ablaketka village (a part of Ust-Kamenogorsk polluted with PCBs) and town of Balkhash of Karaganda oblast, according to the preliminary data of 2005, the mining and metallurgical combine of which can be a source of pollution by dioxins and furans.

Ablaketka village. PCBs pollution in this village is caused by the activity of Ust-Kamenogorsk capacitor plant (UKCP) situated on its territory. The enterprise used trichlorodiphenyl as an impregnated insulating luquid. According to archive data, if one considers industrial wastes on UKKZ only, around 188 to 227 t of polychlorinated biphenyls were released into the environment every year. 12-14 t per year (6-7%) were released through the ventilation systems, the rest of the amount, over 85% mass, were liquid and semiliquid wastes. As a result of the plant operation the enterprise site and nearby area was polluted with PCBs.

In 1990-ies the polluted soil was removed but there were leftovers left in the accumulation pond. The major ecological concern of the enterprise became the residual impurity of the adjacent plant territory, tailings storage and its industrial ground.

The situation of pollution in 1980-ies. Analyses of the samples of atmospheric deposition (snow, water, bottom silts, aquatic vegetation, ground vegetation, fish from excurrent ponds) were carried out through the method of gas-liquid chromotography by the experts of the Institute of applied geophysics named after Ye.K. Fyodorov (1987). In addition, samples of breast milk taken from 9 women who did not have a contact with PCBs and from 3 women who did have the contact, were tested. PCBs were identified in all analyzed samples. Their content in the wastewater of the capactitor plant was from 12 up to 46 *mkg/l*. Water in the channel in the distance of 100 m below the dumping had a very high PCBs concentration - 1.770 *mkg/l*. A sudden fall of PCBs content was observed in the distance of 400 m. Water in the finishing ponds also had PCBs. Bottom silts and aquatic vegetation turned out to be powerful accumulators of such hydrophobic compounds as PCBs which explains a very high level of their content in them. Indexes of accumulation were 10^3-10^4. As accumulators of persistent organic compounds, the bottom silts became a secondary source of long-term water pollution.

Current situation of pollution. Analysis of the samples carried out in 2003, showed content of PCBs in the soil outside the plant territory at the level of 35.73 *mkg/kg*, direct current of the basement of the accumulation and impregnating workshop - 98.31 *mkg/kg*; in treatment facilities, in sludge basins and in the soil of the places of unloading of PCB containers - 1,296.2 and 1,729.4 *mkg/kg* respectively.

Balkhash city. The Balkhash mining and metallurgical combine is an example of a Kazakhtan city where the received preliminary data demonstrate a significant emission of dioxins into the air of the working places. 4 *pg/m*^{3} of dioxins is detected in the air samples of the working places, which is 8 times higher than mac.

Selection of indicators for study of the POPs impact on human health. Persistent organic pollutants represent a serious threat for the human health and the environment, causing birth defects, oncopathology, disfunction of the immune and reproductive systems, fertility problems, a higher liability to diseases and even imbecility. The most vulnerable are fetus and infants who are exposed to POPs impact through the placenta and during nursing.

Studies technique. For the Ablaketka village, residents of the area near the silk factory which is situated in Ust-Kamenogorsk but outside pollution zone of Ablaketka across Irtysh were chosen to be studied.

Birth rate in the studied settlements during a 5-year period was constantly lower than the republican indicators. The lowest birth rate is in Ablaketka village. In 1999 this indicator was 4.3 which is 3.4 times lower than in the country average across Kazakhstan.

Birth defects. During 1999-2003, frequency rate of birth of infants with birth pathology varied. Between 1999 and 2003, in Ablaketka village the rate of the infants with birth defects was 3.1 times higher than in the Republic of Kazakhstan and 1.5 times higher than in the controlled area of the silk factory of Ust-Kamenogorsk. Within 5 years, in Balkhash the birth rate of infants with birth defects was 2.7 times higher than in the Republic of Kazakhstan.

Being pseudohormons persistent organic pollutants are able to destroy natural hormons in the organism. As the result, infants can have birth defect of the urinary system, since normal formations of urethra and lowering of testicles into scrotum depended on androgenic processes, which may be interfered by persistent organic pollutants. A high incidence of pathology of sexual development as well as small development defects, such as cryptorchidism and hypospadias, is also found.

The studies of the structures of the birth pathology show that frequency of androgenic birth development defects (including cryptorchidism and hydrocele) in the area of the silk fabric factory (6.9%) almost does not differ from the indicator in the Republic of Kazakhstan (6.5%). In Ablaketka village (14.8%) and in Balkhash (14.4%) the level of hormonal birth development defects is twice higher than the republican and control level.

Sex ratio. In recent years an infant sex ratio indicator is used as an indicator of the ecological problem. Increase of a girls rate can also be observed. In Kazakhstan within 5 years, the sex ratio is 1.06, i.e. per 100 girls - 106 boys are born. In Ablaketka village this indicator in 2001 and 2003 was lower than the republican one, - 0.85 and 0.94 respectively, i.e. girls ratio was higher.

Cancer diseases. The International Agency on Cancer Studies included some of persistent organic pollutants into the list of oncogenic chemicals that encourage a cancer development in an individual. Today indicators of oncological disease (together with incubation period of tumor development) reflect the environmental pollution situation that was 2-3 decades ago.

The results of epidemiological studies of Ablaketka and Balkhash provide proof of cancerigenicity and malignancy of persistent organic pollutants. The highest oncological disease rate in the period of 1999-2003 was observed in Balkhash. In Ablaketka the disease rate was lower than the republican indicator and 1.2 times higher than in the controlled area of the silk fabric factory.

Hormonal dependent malignancy. The analysis of intensity of hormonal dependent malignant diseases revealed that such cancer localizations as tumors of female genital sphere, breast cancer, prostate cancer, urinary bladder cancer, and thyroid carcinoma are more frequent than in the Republic of Kazakhstan (Table 13).

Table 13 – Intensive indicators of hormonal types of cancer (per 100 thousand female and male population)

Territory	Tumors of female genital sphere	Breast cancer	Prostrate cancer	Urinary bladder cancer	Thyroid carcinoma
Republic of Kazakhstan	344,9	170,1	35,3	19,1	14,0
Combine of silk fabrics, Ust-Kamenogorsk	235,3	130,7	29,3	17,3	17,3
Ablaketka village	509,9	338,1	48,2	74,2	49,4
Balkhash	431,5	205,7	31,8	33,6	30,9

The Kazakhstan average amount of cases of tumors in the female genital areas was 344.9

(per 100 thousand female population). In Ablaketka this indicator was at the level of 355.0 which is 1.5 times higher than among the female population of the area of the Combine of silk fabrics (235.3 per 100 thousand females). In the town of Balkhash the disease rate of tumors of female genital area was 431.5 per 100 thousand of females, which is 1.5 times higher than the republican indicator.

Breast cancer. Breast cancer in the Republic of Kazakhstan is at the level of 170.1 per 100 thousand of women. Among women who live in Ablaketka, breast cancer is at the level of 185.9 per 100 thousand women, which is 1.4 times higher than the indicator of the control area of the silk fabrics factory (130.7 per 100 thousand women). In Balkhash the intensity of the breast cancer rate was 205.7, which is 1.2 times higher than the republican indicator.

Prostrate cancer. Prostrate cancer in the Republic of Kazakhstan is at the level of 35.3 per 100 thousand of male population; in the control area of the silk fabrics factory the level is 29.3. The prostrate cancer rate in Ablaketka is 48.2 per 100 thousand of male population, which is 1.6 times higher than the indicator of the control area of the silk fabrics factory. In Balkhash this pathology is at the level of 31.8 per 100 thousand males.

Urinary bladder cancer. Urinary bladder cancer in the Republic of Kazkhstan is observed at the rate of 19.1 per 100 thousand population. In the control area of the silk fabrics factory this rate is 17.3. This pathology was observed among the people of Ablaketka at the level of 57.7 per 100 thousand population, which is 3 times higher than the republican and control indicators. In Balkhash urinary bladder cancer rate is 33.6 per 100 thousand population, which is 1.7 times higher than the republican indicator.

Thyroid carcinoma. Thyroid carcinoma in the Republic of Kazakhstan is registered at the level of 14.0 per 100 thousand population, while in the control area of the silk fabrics factory this indicators equals 17.3. The thyroid carcinoma frequency among the population of Ablaketka is 24.7 per 100 thousand population, which is 1.4 times higher than the control indicator and 1.7 times higher than the republican one. In Balkhash thyroid carcinoma rate is at the level of 30.9 per 100 thousand population, which is 2.2 times higher than in the Republic of Kazakhstan.

Frequency and structure of tumors of breast cancer and female genital area (hysterocarcinoma, cervical cancer and ovarian cancer) were separately analysed.

The level of the cervical cancer rate in Ablaketka is 84.5 per 100 thousand women, which is 1.2 times higher than in the Republic of Kazakhstan (68.5 per 100 thousand women).

Ovarian cancer is diagnosed 2.6 more often among the women living in Ablaketka (50.7), whereas in the control area of the silk fabrics factory this indicator is 19.0. In Balkhash the ovarian cancer rate is 1.3 times higher compared to the Republic of Kazakhstan and equals 65.2 against 49.6 in the Republic of Kazakhstan per 100 thousand of females.

Thus, the implemented studies of the frequency of oncological pathology, analysis of tumors of the female genital area and hormonal dependent types of cancer (breast cancer, prostate cancer, urinary bladder cancer and thyroid carcinoma) do not exclude the impact of persistent organic pollutants on people who live in the studied areas.

2. ELEMENTS OF THE STRATEGY AND AN ACTION PLAN OF THE NATIONAL IMPLEMENTATION PLAN

2.1. Introduction strategy

The NIP is an operational document that gives a structure to the implementation of the Stockholm Convention in the Republic of Kazakhstan. The NIP is developed on the basis of the large-scale consultation with the partners in a close cooperation with the national structures. Involvement of all concerned parties into the NIP implementation is a necessary condition to achieve the goals. A distinct distribution of the responsibilities and tasks is the key element of the NIP realization that requires a close intersectoral cooperation and appropriate activity coordination.

Responsible for coordination of implementation of the NIP is assigned to the authorized body in the field of environmental protection. With regard to ensuring effective coordination and cooperation it is necessary to transfer the functions of monitoring and evaluation of NIP implementation to subordinate organizations of the authorized body in the field of environmental protection (hereinafter - the subordinate organization).

The task of the subordinate organization shall be the implementation of control and evaluation of the NIP realization as wells as decision-making on its assessment and renewal. Its another important task is to introduce the elements on the NIP realization into other national strategies, political decisions and plans. The subordinate organization shall coordinate the activity on implementation of the international obligations of Kazakhstan under the Stockholm Convention, Rotterdam Convention, Aarhus Protocol concerning hazardous chemicals and thus provide cooperation, increased cost effectiveness, transparency, improvement of accountability and mutual development.

The NIP shall complete the current types of the national activity in the relevant spheres. The realization of NIP activities will involve cooperation with the concerned ministries and departments in the areas of collection and storage of obsolete pesticides, implementation of the detailed inventory on POPs and their safe storage.

Evaluation of the implementation progress is an important component of the NIP. It will allow assessing on what stages of activity implementation the set goals were achieved as well as to understand what components of NIP should be renewed. The implementation evaluation should be carried out through the methods that provide the transparency of involvement of all partners. The results of the evaluation shall be accessible to the public.

The NIP shall include a set of evaluating criteria necessary for evaluation of the progress, its effectiveness and implementation problems. The subordinate organization should act as a responsible link for collection of necessary information, for evaluation of needs of appropriate implementation, for evaluation of the progress and obstacles during the activity process. The subordinate organization should regularly report on the results of the evaluation activity to the authorized body in the area of environmental protection. It is necessary to develop a stable system of accountability and carry out trainings for representatives of all involved parties.

Ministries and other governmental departments shall be responsible for monitoring and evaluation of the activities of their subordinate sectors. The received results should be taken into account during appropriate decision-making. Local authorities shall be responsible for monitoring and evaluation in the spheres that are under their jurisdiction. Executive agencies of certain projects shall be responsible for monitoring of the activity implementation in their sphere and for project reports.

The goal of the assessment of the indicators is to define tendencies and the level of impact of

NIP has on the environment. The majority of the indicators give a quantitative assessment of the implementation process, but it is also necessary to include qualitative indicators for assessment of the activity implementation (e.g., assessment of the population attitude to the POPs problem), received through the public-opinion polls and relevant studies. In addition, the NIP shall include the solution of various institutional problems which need a qualitative assessment rather than a quantitative evaluation. The verified indicators of the NIP may include the following indicators (but not necessarily be limited by them):

- Amendments in accordance with the requirement of the Stockholm Convention shall be introduced into the national structure of the legislation and regulation;
- Specific guidelines/instructions on development of a legal and regulatory structure;
- Development of the informational system on POPs and provision of its functioning;
- Development of the educational system;
- Quantity of the specialists trained;
- Volume and percentage ratio of the obsolete pesticides that were repacked and transferred to a new storage place;
- Volume of the obsolete pesticides accumulated in private households;
- Quantity and percentage ratio of the electric equipment, checked and labelled for its PBCs;
- Quantity of the energy enterprises checked by the authorized body in the area of environmental protection;
- Quantity and percentage ratio of unused capacitors stored in appropriate conditions;
- Quantity of the territorial studies on POPs pollution;
- Quantity of the activities carried out on awareness, information and education of the public;
- Quantity of samples of the environment taken for studies on POPs content;
- Quantity of studies of the sanitary and epidemiological situation;
- Quantity of organizations involved into the process of information exchange and responsible for reports.

Reliability of the data will be verified by the assessment reports of the subordinate organization.

The results of the assessment will be used for updating the NIP and its policy and strategy on the chemical safety, and will also help to make the policy in this sphere more transparent. They shall be distributed among the public organizations (at different levels), in the private sector, among outside donors, in the mass media and public. All these activities shall be reflected in Annual State Reports on the Environment and on the web-site of the subordinate organization.

The NIP shall be reviewed every 5 years. This process is closely connected with the assessment of the activity implementation. The main responsibility for the NIP realization is given to the authorized body in the area of environmental protection.

2.2. Activity, strategies and action plans

2.2.1 Institutional measures and measures on regulation enhancement

It is obvious that in general the provisions of the Kazakhstani legislation in the sphere of the hazardous wastes management should be based on the international guidelines, including those approved by the European Parliament and analogous documents adopted in the developed countries and CIS.

Implementation of the obligations under the Stockholm Convention and implementation of the POPs inventory at the national level shall have a legal basis which reflects responsibility of the physical and legal bodies in this sphere.

Currently, in many cases, the roles, responsibilities and competencies of different ministries and departments are duplicated, with poor coordination of activities present in various fields. This is particularly evident in the case of the management of chemicals, which involves nine authorized bodies with their respective divisions, showing the weak interaction or its absence, and the absence of a common understanding of the priority actions of the country. There is a lack of an integrated system consisting of intersecting issues for effective management of waste and chemicals in the country, due to the limited interaction between public authorities, private service providers and such stakeholders as users. There is little understanding of the life cycle of hazardous chemicals and the role of individual participants in the effective management of these substances and the reduction of the risk of impact on the environment and human health. There is no cooperation between public and private stakeholders with a view to establish a system for the effective management of waste.

To meet obligations under the Stockholm Convention it is necessary to establish a mechanism for coordination among agencies working on the same issue.

It is necessary to amend the legislation of the Republic of Kazakhstan in accordance with the provisions of the Stockholm Convention (legislation in the field of environmental protection, health, plant protection and other regulations). In particular, it is necessary to provide the relevant legislative and regulatory acts of the competences of the authorized bodies in implementation of the legislative requirements of the Republic of Kazakhstan in the field of management of persistent organic pollutants, as well as activities under the NIP.

To strengthen the regulation of persistent organic pollutants it is necessary to consider the initiation of the development of a separate Legislation on amendments and additions to some legislative acts on hazardous chemicals, including persistent organic pollutants. This Legislation may provide for inclusion of the necessary changes and additions to the legislation of Kazakhstan, required in accordance with the provisions of the Stockholm Convention and other international agreements in the field of hazardous chemicals, ratified by the Republic of Kazahstan. It is necessary to strengthen the requirements of the Environmental Code regarding the treatment of POPs wastes, especially in the their disposal. It is also necessary to enhance the Rules for handling persistent organic pollutants and wastes containing them, GOSTs, guidelines, etc.

2.2.2 Measures on reduction or elimination of releases under the intentional production and use

To reduce and phase out POPs releases from intentional production and use it is necessary to adopt both short and long-term activities.

Short-term activities consist of:

−implementation of the detailed inventory and selection of priority sources of pollution of the environmental objects by POPs in the agricultural, industrial sectors, autotransport and other sectors;

−complex studies of the regions of Kazakhstan for availability of POPs pesticides in the environmental objects, dioxins, furans and polychlorinated biphenyls in the releases of the industrial enterprises, communal services and exhaust gases.

To establish a sustainable management system of releases of POPs from intentional production and use it is necessary to implement the following long-term measures:

−organization of the system of control over the pollution of the environmental objects with POPs in the regions with the most dangerous ecological situation;

−development of the program on regulation of the production, import, export and rational use of the chemicals;

−disposal/utilization of accumulated volumes of POPs.

2.2.3 Action Plan of the Republic of Kazakhstan on pesticide wastes, containing POPs

The problem of pesticide wastes (obsolete and useless pesticides), containing pesticides with POPs properties, is a major environmental-social problem. Currently POPs wastes are stored in many cases in destroyed storehouses and at dump sites that may cause a great environmental problem for future generations. Considerable amount of such wastes, storage conditions, state of package, possibility of free access to them and uncontrollable household use of them, increase the risks that such wastes pose for the population and environment, especially in case of natural and technological emergency situations (floods, fires, great emergencies and others).

To solve the problems associated with pesticide wastes containing POPs, it is necessary to measures that take into account various aspects of these problems. In particular, it is necessary to implement activities in the following areas:

1. conduction of the most complete inventory and the creation of a full register of obsolete and unusable pesticides, including pesticides with POPs properties with indication of location, storage conditions, volumes in other applicable information;
2. evaluation and improvement of the regulatory and legislative framework to regulate the manufacture, import, transport, use, recycling, disposal of pesticides, including POPs;
3. estimate of the number and location of obsolete pesticides with POPs properties that were included in the list of the Stockholm Convention in 2009 and 2011;
4. construction of warehouses for temporary storage of pesticide wastes;
5. repackaging of obsolete pesticides;
6. collection and delivery of wastes to the site of elimination or temporary storage;
7. elimination of wastes;
8. restoration of territories contaminated with pesticide wastes.

The activities on pesticide wastes containing POPs are presented in Table 14.

Table 14 – Activities on pesticide wastes containing POPs

№	Task	Year	Indicator
1	Development of a unified format pesticides register	2015	Register format is approved in accordance with applicable legislation
2	Detailed inventory of pesticide wastes	2015-2016	Documented reports on inventory
3	Establishment of a register of pesticide wastes	2017	Register of pesticide wastes, including pesticides with POPs properties
4	Improvement of the legal framework on obsolete pesticides	2017	Introduction of amendments to the existing legislation, including the Environmental Code of the RK.

One of the main challenges in addressing the POPs pesticides problem is the destruction of existing stockpiles of pesticides. In this direction it is necessary to implement the activities outlined in Table 15.

Table 15 – Schedule of work for the destruction of pesticide wastes

№	Activity	Deadline	Responsible body
1	Inventory (survey of warehouses in 80% of the territory not covered by the	2015-2017	The authorized body in the field of environmental protection and its territorial units, the authorized body in

	preliminary inventory)		the field of agriculture and its territorial units, the authorized body in the field of health, local executive bodies, technical assistance
2	Creation of a full register of pesticide wastes	2017	Subordinate organization of the authorized body in the field of environmental protection
3	Identification of samples taken during the inventory	2018	The authorized body in the field of environmental protection, the authorized body in the field of agriculture, the authorized body in the field of health, the authorized body in the field of education and science, technical assistance
4	Construction of warehouses for temporary storage of pesticides	2015-2016	The authorized body in the field of environmental protection, the authorized body in the field of industrial safety, local executive bodies
5	Repackaging of pesticides wastes	2015-2017	The authorized body in the field of environmental protection, the authorized body in the field of agriculture, local executive bodies
6	Collection and delivery to the place of destruction	2018 2019 2020	The authorized body in the field of environmental protection, the authorized body in the field of agriculture, local executive bodies
7	Destruction of pesticides	2018 2019 2020	The authorized body in the field of environmental protection and its territorial units, the authorized body in the field of agriculture, local executive bodies, specialized enterprises for destruction of pesticides
8	Research works on developing technologies for the rehabilitation of soils contaminated with waste pesticides, including pesticides with POPs properties	2016-2020	The authorized body in the field of environmental protection, the authorized body in the field of education and science
9	Restoration of soils contaminated with pesticide wastes	2018-2025	The authorized body in the field of environmental protection, the authorized body in the field of agriculture, local executive bodies

2.2.4. The Action Plan of the Republic of Kazakhstan on safe management, storage and destruction of equipment and waste containing PCBs

In the field of management, storage and disposal of equipment and waste containing PCBs, the following issues are currently relevant for Kazakhstan:

1. A detailed inventory does not cover all enterprises of the country.

2. A system for management, monitoring and control of PCB-containing equipment is not established.

3. The legal framework for the environmentally sound management of operating equipment (rules, instructions) requires improvement.

4. Low capacity of personnel who can monitor and control the operation of the equipment at the enterprises and from the regulatory authorities' side.

5. There are no specialized facilities for temporary storage of PCB-containing equipment and waste.

6. There are no technology for the destruction of materials and wastes containing POPs.

Activities for the safe management, storage and destruction of equipment and wastes containing PCBs are present in Table 16.

Table 16 – Activities on safe management, storage and destruction of equipment and waste containing PCBs

№	Task	Year	Indicators
1.	Development of normative requirements regulating the circulation and operation of PCB-containing equipment	2012	Approval and registration of normative requirements in the Ministry of Justice
2.	Conduction of a detailed inventory of PCB-containing equipment in the country, including the subordinated institutions of the authorized body in the field of defense	2018	Full register of PCB-containing equipment
3.	Inspection of industrial landfills for the presence of PCB-containing equipment and PCB-contaminated areas in 2020	2020	List of industrial landfills List of PCB-containing equipment located in landfills List of the areas contaminated with PCBs at landfills, abandoned factories
4.	Training of personnel of the enterprises and regulatory authorities	2012-2018	Periodic training courses
5.	Selection of sites for storage of PCB-containing equipment	2015	Approval of storage places in the authorized state bodies
6.	Arrangement of the storage of PCB-containing equipment	2016-2017	Acts of the State Commission on acceptance of storages
7.	Preparation of PCB-containing equipment for transportation	2017	Acts of acceptance of work performed on the packaging and labeling of PCB-containing equipment
8.	Transportation of PCB-containing equipment to storage places - 2014	2018	Acts of acceptance for storage
9.	Rehabilitation of contaminated sites	2020-2025	Acts of acceptance of works performed
10.	Construction of the plant for destruction of equipment and hazardous wastes, including PCBs.	2018	Act of acceptance of works performed

11.	Destruction of PCB-containing equipment and waste	2018-2025	Acts of acceptance of works performed

In the area of improving the legislative and regulatory framework of the Republic of Kazakhstan in the field of PCB-containing equipment and waste management it is needed to work in the following areas:

1. to prepare the regulations governing the treatment of PCB-containing equipment (maintenance, decommissioning, storage and transport of PCB-containing equipment);

2. to add to existing regulations the ban on import, export and sale of PCB-containing equipment;

3. to prepare regulations on the organization of temporary storage;

4. to prepare a schedule and procedure for decommissioning and temporary storage of dismantled equipment (according to the attached list of enterprises);

5. to determine the benefits and preferences of the enterprises that temporarily store PCB-containing equipment;

7. to legislatively determine who develops, implements and operates the PCB destruction installations;

8. to restrict and prohibit economic activities in the contaminated areas.

To ensure the safety principles in handling equipment and waste containing PCBs, it is necessary to develop the regulatory framework. In particular, it is needed to develop the following documents:

1. Rules and instructions for the operation of PCB-containing equipment.

2. Rules and regulations for the phase out of PCB-containing equipment.

3. Rules and regulations on the storage of dismantled PCB-containing equipment and wastes at the enterprises.

4. Rules and regulations for transportation to places of temporary storage.

5. Instructions for storage of PCB-containing equipment at the temporary storages (acts of acceptance, location).

6. Instructions on destruction technologies

All instructions and rules should be published in one collection.

To carry out a detailed inventory of PCBs in Kazakhstan, it is first necessary to create a specialized laboratory with equipment, means for measurement, methods of measurement, state standard samples and all of these being introduced to the State Register.

For development of the management system for monitoring and control, Kazakhstan should strengthen the work in the following areas:

1. Increasing the capacity of staff of the enterprises and supervisory organizations on PCB management.

2. Monitoring at the enterprises:

a) monitoring the integrity of the equipment and its load;

b) monitoring of contaminated sites and wastes (sampling, restricted access);

c) selective analysis in specialized laboratories;

g) labeling.

3. State control by the authorized body in the field of environmental protection.

4. Reporting to the authorized body in the field of environmental protection.

5. Temporary storages.

The schedule of activities on safe management, storage and destruction of equipment and waste containing PCBs is presented in Table 17.

Table 17 - Schedule of works on the destruction of PCB-containing equipment and waste

№	Activity	Deadline	Responsible body	Executor
1.	Development of regulations governing circulation, exploitation, storage and disposal of PCB-containing equipment and wastes	2010-2015	The authorized body in the field of environmental protection	The authorized body in the field of environmental protection, technical assistance
2.	Conduction of a detailed inventory of PCB-containing equipment in the country, including the subordinated institutions of the authorized body in the field of defense	2012-2017	The authorized body in the field of environmental protection	The authorized body in the field of industrial safety, the authorized body in the field of energy, territorial divisions of the authorized body in the field of environmental protection
3.	Survey of industrial landfills for the presence of PCB-containing equipment and PCB contaminated territories	2015-2016	The authorized body in the field of environmental protection	The authorized body in the field of industrial safety, territorial divisions of the authorized body in the field of environmental protection, NGOs, subordinate institutions, industrial enterprises
4.	Organization of training courses of personnel of the enterprises and supervisory organizations on PCB management	2011-2020	The authorized body in the field of environmental protection	Service consulting companies
5.	Organization of temporary storages at the enterprises	2012-2017	The authorized body in the field of environmental protection	Equipment owners
6.	Research work on the development of technologies for the destruction of PCB equipment and waste and remediation of contaminated soil	2009-2015	The authorized body in the field of environmental protection	The authorized body in the field of education and science, Research Institute
7.	Rehabilitation of contaminated territories	2018-2025	The authorized body in the	Contractors

			field of environmental protection	
8.	Selection of technologies for destruction of PCB-containing equipment and waste 2010-2015	2010-2015	The authorized body in the field of environmental protection	The authorized body in the field of environmental protection, technical assistance
9.	Construction of the plant for the destruction of equipment and hazardous waste, including PCBs	2015-2018	The authorized body in the field of environmental protection	General Contractor
10.	Preparation and transportation of PCB-containing equipment for the destruction	2018	The authorized body in the field of environmental protection	Equipment owners
11.	Destruction of PCB-containing equipment and waste 2018-2025	2018-2025	The authorized body in the field of environmental protection	Plant for the destruction of POPs, subordinate organization

2.2.5 Action Plan on measures to reduce releases from unintentional production

For the country in the near future, creation of a system for monitoring and control of releases POPs from unintentional production will be actual. It is therefore necessary to carry out the following activities:

1. Creation of a legal and regulatory framework.
2. Conduction of a detailed inventory of the sources of dioxins and furans.
3. Establishment of a dioxin laboratory.
4. Monitoring and development of the annual register of dioxin and furans releases.
5. Measures to reduce emissions of dioxins and furans.

More details on the necessary activities on unintentional releases of POPs, are presented below.

1. Creation of a legal and regulatory framework.

The legislation of the Republic of Kazakhstan does not reflect the issues related to the emissions of dioxins and furans, in view of the novelty of the problem for Kazakhstan.

2. Conduction of a detailed inventory of the sources of dioxins and furans. The following categories of unintentional POPs emissions with insufficient information should be covered more carefully during the inventory:

- Energy complex enterprises (including small boiler houses and gas turbines units).
- Mechanical engineering plants (with existing smelters).
- Wood processing industry (waste incineration).
- Enterprises on thermal processing of the cable.
- Food industry enterprises (with smokehouses).
- Medical institutions - clinics, hospitals, medical points, veterinary services (producing burning medical waste and animal carcasses).

- Enterprises providing service for vehicles (disposal of used machinery and transformer oils).
- Urban and rural municipal landfills, industrial landfills.
- Domestic boilers in private households.
- Cases of intentional ignition of agricultural land and agricultural waste

3. Establishment of dioxin laboratory.

The country is currently lacking laboratory for determination of dioxins and furans. The cost of laboratory equipment according to Russian sources is USD 1 million. Maintenance and analyzes, as well as the necessary reagents are costly. As a result, the cost analysis in foreign countries amounts to USD 1000 in the Russian Federation and for Russian enterprises - USD 500.

However, for the implementation of obligations of Kazakhstan under the Stockholm Convention to monitor emissions of dioxins and furans there is a need to conduct at least periodic tests of unintentional releases of enterprises. In addition, in case of creation in Kazakhstan of enterprise for destruction of POPs (pesticides with POP properties, PCB-containing equipment) it is necessary to monitor the emissions of dioxins and furans. In this regard, it is necessary to create a dioxin laboratory, which could also work for the entire Central Asian region.

4. Monitoring and development of annual register of releases of dioxins and furans should be carried out by industrial enterprises involving a dioxin laboratory. Funding for monitoring should be carried out by private business and from the republican budget.

5. Measures to reduce releases of unintentionally produced POPs, including dioxins and furans. Measures to reduce emissions of PCDD/F and new unintentionally formed POPs consist mainly of the replacement of the original materials and raw materials, and process modifications (including maintenance and monitoring of the equipment as well as retrofitting of existing production). Possible and affordable activities that can be performed individually or in combination, include the following:

- primary precautions when selecting materials в;
- primary precautions in the choice process;
- precautions related to the emission of gases;
- gas emissions cleaning technology;
- procedures for waste disposal.

To introduce the best available technology (BAT) and best environmental practices (BEP) and the renovation of existing production - the sources of dioxins and furans, the analysis is needed of the used flue gas cleaning technologies at various enterprises. Thus the analysis and formulation of recommendations, as well as the study of foreign experience and innovative technologies, retrieval and transmission of BAT from foreign investors or donors to domestic enterprises should engage relevant industry associations.

The work schedule to reduce the emissions of unintentional POPs is presented in Table 18.

Table 18 – Schedule of works to reduce emissions of dioxins and furans

№	Activity	Deadline	Responsible body	Executors
1	Development of regulations on emissions of dioxins and furans and other unintentionally produced POPs	2010-2015	The authorized body in the field of environmental protection	The authorized body in the field of environmental protection
2	Conduction of a detailed	2015-2016	The authorized	Territorial divisions

	inventory of the sources of dioxins and furans and other unintentionally produced POPs		body in the field of environmental protection	of the authorized body in the field of environmental protection, subordinate organization
3	Establishment of the dioxin laboratory	2016	The authorized body in the field of environmental protection	The authorized body in the field of environmental protection
4	Monitoring and preparation of the annual register of releases of dioxin and furans and other unintentionally produced POPs	2010-2028	The authorized body in the field of environmental protection	Territorial divisions of the authorized body in the field of environmental protection, subordinate organization
5	Analysis of the existing flue gas treatment systems of the enterprises and development recommendations for the implementation of best available techniques and best environmental practices (BAT & BEP) to reduce releases of dioxins and furans and other unintentionally produced POPs	2010 – 2020	The authorized body in the field of environmental protection	Industrial associations
6	Reconstruction of existing technologies and the introduction of BAT & BEP	2020-2028	The authorized body in the field of environmental protection	Industrial enterprises
7	Creation of enterprises on processing of medical waste with the BAT & BEP	2015-2028	The authorized body in the field of environmental protection, public health, local executive authorities	Local executive authorities, private business waste management

2.2.6 Measures on new POPs

According to the obligations under the Stockholm Convention, the Republic of Kazakhstan is required in the coming years to conduct an inventory of new POPs, including information on production, import, export, distribution, use and management of new POPs. The inventory of new POPs pesticides will be held within the inventory of pesticides. Update on releases of unintentionally produced new POPs will be held in the framework of updating the inventory of unintentionally produced POPs. Furthermore, an inventory should be conducted of new industrial POPs. In this case, the inventory of chemicals for crop protection: lindane, alpha-HCH, beta-HCH, endosulfan, chlordecone, should place emphasis on the obsolete pesticides and waste. During he inventory of

industrial chemicals used in the manufacture of products, namely: Polybrominated biphenyl ethers (Penta-BDE, octa-BDE), perfluorooctane acid (PFOS), perftorooctane sulfonil (PFOS-F) - the focus should be on the entire life cycle of these substances. The inventory of hexabrombiphenyl and pentachlorbenzenet should focus on the reduction of unintentional releases.

The Secretariat of the Stockholm Convention recommend a layered approach for the inventory of penta-BDE, octa-BDE and PFOS:

- Level 1 - initial assessment;
- Level 2 - preliminary inventory;
- Level 3 - detailed inventory.

Initial assessment involves gathering of information about past and present data on the import and use of PBDEs and PFOS from key stakeholders. This assessment includes the following data:

- Production of POPs PBDE, OBDE PFOS;
- Use of POPs PBDE, OBDE PFOS;
- POPs-PBDE, OBDE PFOS in the waste;
- Lifecycle of the OBDE, PBDEs and potential emissions.

The inventory process should involve stakeholders. Potential stakeholders for the new POPs inventory are listed in Table 19.

Table 19 - Potential stakeholders and sources of information for the inventory of new POPs

Substances	Potential stakeholders and sources of information
Alpha-HCH, beta-HCH Chlordecone, lindane	Manufacturers, importers and distributors of pesticides; farmers' associations; pharmaceutical manufacturers, distributors and retailers (for lindane); agencies on administration and licensing (lindane)
Hexabrombiphenyl; Hexabrombiphenyl ether and heptabrombiphenyl ether; Tetrabrombiphenyl ether and pentabrombiphenyl ether	Plastic Industry, electrical and electronic equipment; furniture, textiles and packaging materials; construction industry; industry for the recycling of electrical and electronic equipment, plastic and foam
Perfluorooctane acid, its salts and perfluorooctane sulfonyl	Sectors related to the following applications: Fire-fighting foams, carpets, leather/textile sewing, upholstery, paper and packaging, paints, industrial and household chemicals, floor polishes, denture cleanser, shampoo, industrial and household chemicals, hydraulic fluids, anti-additives, anti-reflective coatings, photographs, photolithography adhesion control materials and metal coating bait ants and termites

Table 20 shows the implementation schedule for the inventory of new industrial POPs.

Table 20 – Schedule of works on the inventory of new industrial POPs

№	Activity	Deadline	Responsible body	Executors
1	Conduction of an initial assessment of the use of new POPs: collection of information on past and present data on the import and use of PBDE, OBDE and PFOS from key stakeholders	2015	The authorized body in the field of environmental protection	The authorized body in the field of environmental protection, technical assistance
2	Conduction of a detailed inventory of the sources of new industrial POPs (PBDE, OBDE PFOS): the use, the life cycle and potential emissions.	2015-2016	The authorized body in the field of environmental protection	The authorized body in the field of environmental protection, technical assistance
3	Monitoring of new industrial POPs in samples of products, waste storage areas, circulating flows (electronic and electrical equipment, furniture and other)	2017	The authorized body in the field of environmental protection	The authorized body in the field of environmental protection
4	Development of measures to reduce emissions of new POPs into the environment, including the introduction of BAT for waste collection and recycling	2018	The authorized body in the field of environmental protection	Territorial division of the authorized body in the field of environmental protection, industrial associations
5	Development of proposals to the legislative acts regulating the use of new POPs	2018	The authorized body in the field of environmental protection	The authorized body in the field of environmental protection, industrial associations
6	Informing the main stakeholders on the regulation of new industrial POPs (Customs Service, private business of manufacturing, importing goods, waste management companies, local executive authorities)	2014-2018	The authorized body in the field of environmental protection	The authorized body in the field of environmental protection, local executive authorities, Industrial enterprises

2.2.7 Measures to reduce releases from stockpiles and wastes

Burial of pesticides with POP properties was conducted randomly and uncontrollably, which greatly complicates the work on their elimination.

Insecticides were buried without prior detoxification, since 1971, when the sale of these substances has been prohibited. Chemicals were buried in places remote from human settlements, however, 30 years later it appeared difficult or even impossible to find these burials.

Organochlorine chemicals, including DDT and aldrin, were used as pesticides, but the government of Kazakhstan has banned the sale of these substances in the 1970-ies, as their toxic properties and the ability to accumulate in the tissues of living organisms were proved. It was then decided to dispose of (bury) chemicals in small quantities in different places.

2.2.8 Action plan on the territories contaminated with POPs

In the field of cleaning the areas contaminated by POPs, and reducing their harmful effects on human health and the environment, it is necessary to implement measures based on the following principles:

- The basis for the management of contaminated areas is a thorough inventory in these areas, followed by an analysis of the environmental hazards and assessment of the needs for cleaning. It is also necessary to provide economic substantiation of such activities
- A thorough inventory of the state of contaminated territories is also needed to prevent further pollution of the emerging leakage, evaporation or contamination of the environment as a result of natural disasters, such as floods, in the event of which special preventive measures should be developed.
- Identification of the ways for remediation of contaminated areas:

- removal of contaminated soil layer with the surface and packing it in a sealed container for subsequent transport to the place of destruction;
- biological remediation of contaminated areas.

- Identification of the ways for destruction of contaminated soil:

- organization of destruction on the existing production facilities in Kazakhstan (JSC "Mittal Steel Temirtau", cement plants);
- organization of new production in Kazakhstan for the destruction of soil contaminated with PCBs;
- removal and destruction of soil contaminated with PCBs in Kazakhstan [to another country (Russia, Slovakia, Switzerland, France, Germany and others)].

2.2.9 Facilitating or arranging information exchange and stakeholder involvement

To improve the exchange of information on new and old POPs between stakeholders and to strengthen inter-agency cooperation of public authorities it is necessary to implement the following actions aimed at:

- creation of an interagency group of representatives from government, business and NGOs;
- initiation of industrial and professional users to provide information (on reduction or elimination of POPs, sources of POPs emissions);
- investigation of the alternatives to POPs, including information relating to their risks as well as the economic and social costs;
- improvement of statistical reporting and accounting of chemicals at the national level;
- raising awareness of decision-makers, industry and the public about the impact of POPs on the environment and human health, the importance of sound management of chemicals at all stages of their life cycle;
- strengthening the technical capacity of territorial analytical laboratories to obtain reliable operational data on pollution of surface and groundwater, soil and air in order to undertake

rehabilitation and prevention measures, identification and investigation of areas of pollution originating from landfills in order to identify areas in need of cleaning and restoration

- expansion of research on assessment of contamination of soil and groundwater, especially in places of burial of banned and obsolete pesticides, waste in landfills and other contamination "hot spots".

The proposed measures will facilitate and organize information exchange and stakeholder involvement in solving the problems connected with POPs. Also, the implementation of these measures will allow to improve the monitoring of environmental pollution, to analyze the possible effects on human health.

2.2.10 Public awareness, information and training

During the NIP preparation, a low level of awareness about the sources of POPs and their effects on health has been revealed. Information on the POPs issue is informative, but is not a preventive or educational.

It seems appropriate to implement the following measures aimed at raising public awareness, information and training:

- training of workers, scientists, educators, technical and managerial personnel;
- development of materials for education and public awareness and exchange at the national and international levels;
- taking into account the different levels of knowledge and public interest, it is advisable to arrange the individual materials and forms of work for each target groups (teachers, pupils, students, doctors, government officials, scientists, and others.);
- ensuring public access to information on persistent organic pollutants and regular update of it;
- education of society should happen not only by providing information on POPs and their impact on the environment and health, but also on ways and means of reducing POPs pollution.

2.2.11 Evaluation of effectiveness

The organization responsible for implementation of the NIP of Republic of Kazakhstan is the authorized body in the field of environmental protection. Implementing agencies are responsible for specific activities. For the purpose of effectiveness evaluation, the implementing agencies will prepare summary reports on the measures taken, which will include a description of the measures under the NIP and their results. The authorized body in the field of environmental protection will perform control functions.

The authorized body in the field of environmental protection will also create a system of monitoring of the environmentally sound management of persistent organic pollutants in Kazakhstan as part of the USMSE. For environmentally sound management of PCB-containing equipment in operation, it is planned to establish a system for monitoring of their condition and storage. The establishment of the annual Register of releases of not only industrial POPs, but also of utilities services (fires of residential and industrial premises, dumps, landfills, and others).

Reduction of POPs level in environmental media and food will indicate successful implementation of the proposed action plans in the NIP. If the performance evaluation shows that the risk of POPs is insufficiently reduced, the further measures can be taken.

Effectiveness evaluation should also cover issues relating to the cost effectiveness of the NIP. It should also include an assessment of whether the selected approach and actions reduce the risk of POPs in economic terms.

The evaluation is made on the basis of available scientific, environmental and technical information, including:

a) reports and other monitoring information provided in accordance with provisions of paragraph 2;

b) national reports submitted in accordance with Article 15; and

c) non-compliance information provided pursuant to the procedures established in accordance with Article 17.

The results of the NIP will be reported regarding the effectiveness of implementation. Taking into account the structure of the NIP, the action plans contained in it and the requirements for reports of the Conference of the Parties to the Stockholm Convention on POPs, the Scheme that will be applied to Kazakhstan on providing reports on the implementation effectiveness is presented in Table 21.

Table 21– Scheme for submitting implementation effectiveness evaluation of the obligations under the Stockholm Convention on POPs

Year	Activity	Result	Correspondence to the date of the Conference of the Parties (COP)
The first phase of the NIP *(2010-2014*):			
2009	Approval of the NIP on POPs	Presenting the NIP to the Conference of Parties	COP-4
2011	Evaluation of the short-term action plan	Report on evaluation of the short-term action plan	COP -5
2013	Evaluation of the implementation effectiveness	Report on the implementation effectiveness evaluation Док	COP -6
The second phase of the NIP *(2015-2017*):			
2015			COP -7
2017	Evaluation of the mid-term plan	The mid-term plan (Progress is evaluated against the objectives set by the NIP action plans. Particular attention is drawn to the dioxins and furans).	COP -8
The third stage of the NIP implementation *(2018-2028.*):			
2019			COP -9
2021			COP -10
2023			COP -11
2025	Evaluation of the long-term action plan	The Long-term Action Plan (Progress is compared against the objectives of the NIP action plans).	COP -12

2.2.12 Reporting

Conference of the Parties to the Stockholm Convention requires Kazakhstan to submit national and thematic reports covering the implementation of the Convention. The reports shall be submitted in a specific format approved by the Secretariat of the Convention. The requirements for the reports and the timing of reports are presented in Table 22.

Table 22 - Mandatory requirements for reports and their frequency in accordance with the provisions of the Convention

The main requirements of the Stockholm Convention	Requiremment description	Frequency
Article 5 "Measures to reduce or eliminate releases as a result of unintentional production": paragraph (a):	Each party will develop an action plan or, if appropriate, a regional or subregional action plan and will subsequently implement it as part of the implementation plan specified in Article 7 designed to identify, characterize and address the release of chemicals listed in Annex C, as well as to facilitate implementation of subparagraphs b) - e).	Kazakhstan provides its Implementation Plan to the Conference of the Parties within two years after the date of entry into force of the Convention for it
Article 5 "Measures to reduce or eliminate releases as a result of unintentional production": part (v) of paragraph (a):	A review of the strategies and their success in meeting the obligations set out in this paragraph; such reviews shall be included in reports submitted in accordance with Article 15.	Every 5 years
Article 7: Implementation plans	Each Party shall develop and realize an implementation plan on its obligations under the Convention; reviews and updates the NIP; where appropriate cooperates directly or through global, regional and subregional organizations, and consults its national stakeholders, in order to facilitate the development, realization and updating of the implementation plans; strives to use support and, if necessary, creates means to integrate the NIP on POPs, in its sustainable development strategies where appropriate.	Kazakhstan provides the NIP within two years after the date of the entry into force of the Convention; reviews and updates its implementation plan in an appropriate manner, on a periodic basis (every 4 years) and in accordance with the procedure specified by decision of the Conference of the Parties
Article 15: Provision of information	Each Party shall provide to the Conference of the Parties the information on the measures it has taken to implement the provisions of the Convention and on the effectiveness of such measures in meeting the objectives of the Convention Each Party shall provide to the Secretariat:	In accordance with the procedure specified by decision of the First Conference of the Parties

	a) statistics on the total volume of its production, import and export of each of the chemicals listed in Annexes A and B or a reasonable estimate of such data; and b) to the realistic extent, a list of the States from which it has imported each of such substance and the States to which it has exported each of such substance.	
Annex A, Part II, paragraph (g): PCBs	Every 5 years, each party shall submit a report on progress in eliminating the production and use of PCBs and presents them in accordance with Article 15	Every 5 years

Table 23 shows a schedule for provision of summary reports by the Republic of Kazakhstan after the ratification of the Convention in accordance with the requirements of the Stockholm Convention.

Table23 – Schedule for provision of summary report by the Republic of Kazakhstan in accordance with the requirements of the Stockholm Convention

Years											
2010	**2011**	**2013**	**2014**	**2015**	**2017**	**2019**	**2020**	**2021**	**2023**	**2024**	**2025**
	COP-5	**COP -6**		**COP -7**	**COP -8**	**COP -9**		**COP -10**	**COP - 11**		**COP - 12**
Entry into force of the Stockholm Convention on POPs for the Republic of Kazakhstan. Approval of the NIP.	I National report. Review of strategies to reduce unintentional releases of POPs	Implementation effectiveness evaluation	Report on progress in eliminating the use of PCBs	II National report. Review of strategies to reduce unintentional releases of POPs	Implementation effectiveness evaluation	Report on progress in eliminating the use of PCBs	III National report. Review of strategies to reduce unintentional releases of POPs		Report on progress in eliminating the use of PCBs	IV National report. Review of strategies to reduce unintentional releases of POPs	Implementation effectiveness evaluation

2.2.13 Strategic objectives for Research, Development and Monitoring

The direction of research activities related to space monitoring for unintended releases of POPs seems promising. In Kazakhstan thermal emissions from the combustion of waste oil and gas production are a great threat as sources of pollution of the environment. Solid and gaseous substances are released to the air. Among them, not only the sulfur dioxide, carbon and nitrogen, and hydrocarbons, but also persistent organic pollutants. Part of the thermal emission is due to technological peculiarities of oil or gas extraction (burning of torches used for gas flaring, etc.), partially due to emergencies (burning pits during a power outage, burning of oil spills, etc.).

Unlike torches used for gas flaring and not accompanied by emissions of POPs, in terms of POPs the most urgent problem arises from spontaneous and emergency fires, leading to the burning of waste oil and gas production: waste oil and gas production is a source of persistent organic pollutants.

To monitor the spontaneously occurring and emergency fires it is expedient to introduce the satellite monitoring system. Such monitoring will help regulatory authorities in detecting heat sources of landscape pollution that have arisen spontaneously, determining the time of their action and power.

Available in Space Research Institute of the RK experience on interpreting remote sensing data allows solving a number of issues related to this subject. The System of Low-resolution Meteorological Satellites NOAA/AVHRR provides information on the surface of the earth in five spectral bands: two visible and three

infrared (ch1 0,58-0,68 microns; ch2 0,725-1,1 microns; ch3 3,55-3,93 microns; ch4 10,3-11,3 microns; ch5 11,5-12,5 microns) with a 2,700 kilometers widths and a resolution at nadir of 1.1 km. The sensitivity of the AVHRR scanner in the thermal channels allows distinguishing the difference in temperature of 0.1^{o}C and determine the absolute temperature with an accuracy of 0.2^{o}C. Currently, there are three on-orbit NOAA 10,12,16 satellites bodied with a period of 90 minutes. Sensitivity of the AVHRR scanner makes it possible to fix the heat source area of 50 m^2 with a spectral brightness temperature over 2000^{o}C (gas flame). In this case, the average temperature in the area of one km^2 (estimated minimum area) will increase by 0.1^{o}C. In case of the relatively large oil fire, the image will capture not only the area of high temperature, but also associated with them areas of low temperatures caused by the cold upper edge of the clouds of smoke.

The new satellite system is equipped with a hyperspectral MODIS scanner (36 spectral channels) with a resolution of 250 m, 500 m and 1000 m. In the orbit there is the first satellite of that system (TERRA). The scan width is 2,200 km, the spectral resolution is four times better than of the AVHRR scanner. Presumably, the sensitivity of the thermal channels (channels № 20-36) will allow to capture heat sources with a total area of 25 m^2 gas flame. Recognition accuracy can be significantly improved by using additional terrestrial maps showing the location of the developed oil and gas fields.

The works on remote analysis of the power of heat sources in the oil and gas areas producing persistent organic pollutants at night and daytime are realistic. This approach can identify both permanent sources of oil and gas waste combustion, their brightness temperature and the current (emergency or salvo) combustion sources, time of their operation, areal and temperature characteristics according to historic space data of any of the given ages.

With these purposes, a series of test sources are to be analyzed in daily monitoring according to day and night shooting of the NOAA satellite system for gathering information about the possibilities of remote sensing in fixing the assessment of the dynamics, duration and power of heat emission. MODIS space information allows specification of the areal characteristics of territories exposed to fire.

The implementation of such projects will contribute to the future development of geographic information system (GIS) that links map information about oil and gas fields with the data of satellite monitoring. This system will keep track of routine and emergency thermal modes of data objects, give timely and objective information on the modes of their functioning.

2.2.14 Technical and financial assistance

Kazakhstan belongs to the group of countries with economies in transition and, as stated in Article 12 of the Convention, shall receive technical and financial assistance. Transitional Euro-Asian geopolitical position occupied by the country allows Kazakhstan to receive technical and financial support from both traditional donors - the EU, and Asian-Pacific region countries.

Some NIP activities are costly. In this regard, adequate technical and investment support from national and international organizations is one of the most important conditions for the successful implementation of the NIP.

The Government of Kazakhstan requires technical assistance in the following areas:

- Enhancing and improving consistency of national and international legislative framework for POPs activities and the development of financial mechanisms;
- Support of the subordinate organization in implementation of the NIP, evaluation and preparation of financial statements of the NIP, fostering coordination with other projects of the International Monetary Fund (IMF) and projects with bilateral financing;

- Establishment of a national information system (extended database with accurate and constantly updated information on POPs);
- Increasing the capacity of subordinate organizations in the field of data processing and presentation;
- Strengthening monitoring in the field of environment and health, including the capacity to develop reporting and analysis;
- Support for the energy sector in the identification of PCBs in electrical equipment and conducting further activities for the destruction of PCBs;
- Conduction of training for employees of the enterprises;
- Support in the identification, management and cleaning of contaminated sites;
- Study of the potential for implementation of planned activities;
- Development and implementation of programs to raise the level of public knowledge, based on the principle of "the public has a right to know and participate".

International financial support is needed for the following planned activities to clean up contaminated areas:

- Provision of materials for repackaging of obsolete pesticides;
- Elimination of obsolete pesticides;
- Elimination of PCB-containing oils and equipment contaminated with PCBs (eg capacitors), and wastes;
- Cleaning of contaminated areas.

Taking into account the short-term nature of the NIP actions regarding technical and financial assistance, the target will be to develop suitable projects for co-financing and co-operation with the financial mechanism of the Convention - the GEF. However, Kazakhstan will actively participate in the work of the Conference of the Parties to advance the provisions on technical and financial assistance. Professional support of any initiatives planned by regional or sub-regional centers established under the Convention, will be expanded.

2.3 Proposals and priorities for the development and capacity building

The priority areas for achieving the NIP, which require strengthening of existing capacity and capabilities are:

1. Establishment of a legal framework for implementation of the obligations of Kazakhstan under the Stockholm Convention.
2. Inclusion of POPs inventory into the national statistical reporting system and the state system of environmental monitoring.
3. Development of a long-term target program for the elimination of POPs and reduction of releases from unintentional POPs sources.
4. Implementation of projects on the destruction of POPs; rehabilitation of areas polluted with them, and reduction of unintentional releases of POPs.
5. Monitoring of POPs.
6. Organization of the chemical analytical laboratory focused on the tasks of the Stockholm Convention on POPs. There is no laboratory in the country accredited on the international level. In the course of implementing the country's obligations under the Convention the need for such a laboratory will rise acutely. Its creation - is one of the most urgent tasks of the next few years.
7. Organization of the dioxin laboratory.

2.4. NIP implementation schedule and measures leading to success

The elimination of persistent organic pollutant wastes in Kazakhstan and reduction of the impact of POPs on human health and environmental quality – are the main goals of the NIP.

The gradual solution of the NIP tasks is suggested to achieve the set goal.

At the first phase of the NIP (2010-2014):

- development of normative legal base in the field of POPs management;
- detailed inventory of POPs wastes and evaluation of unintentional releases of them;
- identification of areas that require the destruction of POPs;
- Development and implementation of pilot projects on restoration of the land contaminated with POPs;
- suggestions to the Secretariat of the Stockholm Convention on POPs regarding new POPs of global significance, widespread in Kazakhstan;
- raise awareness about the situation with POPs in Kazakhstan.

At the second phase of the NIP (2015-2017):

- complete elimination of pesticide wastes, except the buried ones;
- introduction of best available treatment technologies that reduce emissions of dioxins and furans;
- establishment of a system for monitoring of POPs under the USMSE of the RK.

At the third stage of the NIP (2018-2028):

- liquidation of landfill repositories and newly identified warehouses of obsolete and unwanted pesticides;
- complete elimination of industrial POPs;
- ongoing monitoring of POPs.

To track the NIP progress there is a prepared "Schedule of provision of summary reports by the Republic of Kazakhstan in accordance with the requirements of the Stockholm Convention after the ratification of the Convention by the Republic of Kazakhstan", the effectiveness of the implementation is being carried out and the action plan provides specific performance indicators.