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IMPLEMENTATION PLAN OF THE REPUBLIC OF KAZAKHSTAN ON THE OBLIGATIONS UNDER THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS FOR 2017 - 2028

Astana, 2017

CONTENTS **Page**

Abbreviations

IPEN	International Persistent Organic Pollutants Elimination Network
RECETOX	ResearchCentreforToxicCompoundsintheEnvironment
ABS	Acrylonitrile-butadiene-styrene polymers
JSC	Joint-Stock Company
JSC OT	Joint-Stock Company of the Open Type
GDP	Gross Domestic Product
GRES	State District Power Station
HCB	Hexachlorobenzene
HCH	Hexachlorocyclohexane
GEF	Global Environment Facility
DDT	Dichlor Diphenyl Trichlormethylmethane
ADR	Dangerous Good Transportation by Road
SNS ENRM RoK	Single National System of Environmental and Natural Resources Monitoring of the Republic of Kazakhstan
EU	European Union
CP	Conference of the Parties of the Stockholm convention on persistent organic pollutants
VOC	Volatile Organic Component
LEB	Local Executive Body
BAT	Best Available Technology
SRI	Scientific Research Institute
NCC POPs	National Coordination CenteroftheRepublicofKazakhstanonthepersistentorganicpollutants
U-POPs	Unintentionallyproducedpersistentorganicpollutants
NIP	Implementation plan of the obligations of the Republic of Kazakhstan under the Stockholm Convention on Persistent Organic Pollutants
NGO	Non-Governmental Organization
NCE	NationalChamberofEntrepreneurs
BEP	BestEnvironmental Practice
OJSC	Open Joint-Stock Company
OSCE	Organization for Security and Cooperation in Europe
Octa-BDE	Octabromodiphenyl ether
UNO	UnitedNationsOrganization
PAH	Polycyclic aromatic hydrocarbons
PBDE	Polybrominated Diphenyl Ethers
Penta-BDE	Pentabromdiphenyl ether
PBT	Polybutyleneterephtalate
PeCB	Pentachlorobenzene
UNDP	UnitedNationsDevelopmentProgram
PFOS	Perfluorooctanoic Sulfonate
PCB	Polychlorinatedbiphenyls
PCDD/PCDF	Polychlorinateddibenzodioxins/furans
RSE	Republican State Enterprise
RoK	Republic of Kazakhstan
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
CIS	Commonwealth of Independent States
POPs	Persistent organic pollutants

USSR	Union of Soviet Socialist Republics
USA	United States of America
SMW	Solid Municipal Waste
LLP	LimitedLiabilityPartnership
TPS	Thermal Power Station
UKCP	Ust-Kamenogorsk Condenser Plant
SCO	Shanghai Cooperation Organisation
CRT	Cathode Ray Tube
UNEP	UnitedNationsEnvironmentProgramme
UNIDO	UnitedNationsIndustrialDevelopmentOrganization

Summary

TheNationalImplementationPlanoftheRepublicofKazakhstanontheobligationsundertheStockholmConventiononpersistentorganicpollutantsfor 2017 – 2028 hasbeendevelopedintheframesofimplementationoftheStockholmConventiononpersistentorganicpollutants. 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 in Kazakhstan, 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 POPs; 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.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 NIPaddresses the questions of POPs problem solution in Kazakhstan until 2028.

National priorities of the Republic of Kazakhstan are linked with the solution of priority problems in the field of POPs. Among them:

- detailed inventory of POPs, including new POPs, listed in the Stockholm Convention;
- development of POPs monitoring system
- creation of a unified system of POPs control;
- development of legislation on the issue of chemical safety and creation of mechanisms for its implementation.
- increasing of the human capacity in the field of POPs.

Strategic direction of the NIP on the obligations under POPs-containing pesticides.

Thestrategicdirectionsofactivitiesinthissphereare:

- 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.
- Organization of monitoring of POPs-containing pesticides within the framework of USMSE RK.
- Adoption of measures on development and introduction of environmentally safe technology of disposal of identified POPs-containing pesticides stocks.

Strategic direction of the NIP in the field of polychlorinatedbiphenyls.

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 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. InthisdirectionKazakhstanneeds:

- to introduce inventory of releases of the unintentionally produced POPs;

▪ to conduct a research of a possibility of the best available technologies use for decrease in U-POPs releases;

▪ to introduce the best available technologies, and also to modernize the existing technologies for the purpose of decrease in U-POPs releasesin the industries.

Strategic directions of the NIP 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 complete inventory on identification of stockpiles and wastes, and also identifications of the areas polluted by POPs, including new POPs;

▪ to provide safe, effective and ecologically reasonable waste and POPs stockpiles management according to requirements of the Stockholm and Basel conventions, in particular to take measures for providing:

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

–disposed of POPs wastes in an environmentally and economically sound manner;

–to forbid any use of POPs in production and processes

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

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.

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.

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 governmentsof 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"), whichare 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 (thatarealsoindustrialPOPsandproductionwastes);

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 POPsto 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,used in the industry and on transport; use of industrial technologies resulting in unintentional releases of POPs; formation of dioxins and furans and other unintentional POPs during open combustion and burning of waste without waste gas system.

The agriculture of the country faces an urgent problem of obsolete and unwanted pesticides and their chemical identification. 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. 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.

Concerning PCB, a problem is the equipment supporting him and alsoPCB polluted waste and territories. This equipment poses a great danger to the workersand inhabitants of nearby settlementsin case of leakage may occur.Evaporations of PCB from the polluted soil is also capable to cause a loss to human health and the environment on a global scale

In Soviet period PCB were made on the territory of the Russian Federation. From 1968 to 1990 PCBs were used at the Ust-Kamenogorsk capacitor plant in industrial production as a liquid for filling capacitors. Currently, on the territory of the Republic, the following PCB-containing equipment has been identified: 114 transformers and about 50 thousand capacitors. The volume of PCBs content in them is roughly estimated at 980 tons. From 2006 to 2015 48 transformers and 1473 condensers containing PCB were identified in addition. In 2012 inventory of the oil-filled equipment regarding pollution existence has been begun with polychlordiphenyl which isn't finished yet. There are 22 PCB polluted coupling condenser of the CM brand and 2 switches revealed(for January 1, 2017).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.

During the preliminary inventory 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". Laterin 2009 6 moreterritorieswereadded.

The total amount of POPs - containing waste, including the polluted soil, in 2006 was

approximately estimated at 250 thousand tons. On stocks of POPs waste Kazakhstan takes the second place among the countries of Eastern and Central Europe after the Russian Federation.

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 8thDecember 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.

In 2014-2016 within joint project of the Government of RK/UNDP/GEF "National implementation plan update, integration of persistent organic pollutants control into the process of national planning and sustainable control of medical wastes in Kazakhstan " NIP was updated. 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 chemicalsand also Guidelines on revision and updating of national implementation plans (Annex to the decision CK-1/12).

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 (2009 and 2011 years), inventory data of new POPs (PBDE and PFOS)and updating data on the inventory of unintentionally produced 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, 17 753 184 administrative districts, 87 cities, 30 villages and 6 693 rural settlements. The capital is Astana (since 1997).

The population of Kazakhstan is 17 people (as of 1 May 2016). Urban population – 57%, rural population - 43%.

The following population groups are especially vulnerable to POPs: children younger than 14 years old – 28.5%, and elderly people – 10.8%.

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

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.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. However, due to world crisis and devaluation of tenge, in 2015 GDP decreased to 10,5 thousand USD per capita (at an official rate).

In 2015volume of industrial output was 14 925 billion tenge that is nearly 1,5% less, than in 2014. At the same time the number of the industrial enterprises and productions in 2015 has grown in relation to 2014 and was 11 619. Gross production (services) of agriculture in 2015 was 3 307 billion tenge.

Agricultural land in Kazakhstan (of January 1, 2016) make up100,8 mln.*ha* (36.9% of al territory of RoK). The total forest area is - 22.9 million hectares, inventory of water resources - 4.1 million hectares.

Provided below (Tables 1-2) is basic information on the industrial and agricultural sectors of the Republic of Kazakhstan.

Table 1- Gross Domestic Product by the production method, 2015 year[1]

Name	mln. tenge	structure, %
Gross Domestic Product by the production method	**40 884 133,6**	**100,0**
Agriculture, forestry and fishing	1 925 866,5	4,8
Miningandquarrying	5 170 567,7	12,7
Manufacturing	4 201 012,1	10,1
Electricity, gas, steam and air conditioning	693 589,4	1,7
Water supply; sewerage system, control over the collection and distribution of waste	101 807,2	0,2
Construction	2 447 736,1	6,0
Wholesale and retail trade; repair of motor vehicles and motorcycles	6 994 015,8	17,0
Transportation and warehousing	3 520 545,5	8,6

Services for accommodation and meals	420 185,0	1,1
Information and communication	1 071 814,5	2,6
Financial and insurance activities	1 430 703,9	3,5
Realestatetransactions	3 685 580,4	9,0
Professional, scientific and technical activities	1 864 408,9	4,6
Activities in the field of administrative and support services	846 480,3	2,1
Public administration and defense; compulsory social security	809 408,7	2,0
Education	1 197 316,9	2,9
Health and social services	729 986,8	1,8
Arts, entertainment, and recreation	329 278,5	0,8
Otherservices provision	1 312 678,3	3,3
Activities of households as employers of domestic staff and producing goods and services for personal consumption	30 917,9	0,1
Totalby industries	**38 783 900,4**	**94,9**

Note:
1 Source: Brochure "Kazakhstan today", Committee on statistics of the Ministry of national economy of the Republic of Kazakhstan, Astana 2016

Table 2 - Industrialoutput (goods, services)andgross output of goods (services) in agriculture by regions, 2015 year

Name	Industrial output (goods, services), mln.tenge[1]	Gross output of goods (services) in agriculture by regions, mln. tenge[2]
Republic of Kazakhstan	**14 925 230,0**	**3 307 009,6**
Akmola oblast	335 402,0	290 893,2
Aktobe oblast	1 014 433,0	165 244,3
Almaty oblast	561 874,0	551 101,1
Atyrau oblast	3 442 882,0	58 765,5
West Kazakhstan oblast	1 302 068,0	106 544,4
Zhambyl oblast	283 950,0	218 726,5
Karaganda oblast	1 416 672,0	197 273,0
Kostanay oblast	443 082,0	294 608,2
Kyzylorda oblast	600 757,0	79 186,5
Mangistau oblast	1 568 683,0	11 734,3
South Kazakhstan oblast	670 407,0	426 894,4
Pavlodar oblast	1 044 224,0	152 407,9
North Kazakhstan oblast	166 904,0	380 814,2
East Kazakhstan oblast	1 021 779,0	366 973,1
Astana city	389 132,0	2 416,9
Almaty city	662 981,0	3 426,1

Note:
1 Source: Statistical book "Industry of Kazakhstan and Regions, 2011-2015", Committee on statistics of the Ministry of national economy of the Republic of Kazakhstan, Astana 2016
2 Source: Statistical book "Rural, Forest and Fishery in the Republic of Kazakhstan, 2011-2015", Committee on statistics of the Ministry of national economy of the Republic of Kazakhstan,

Astana 2016

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 2015 the output of pesticides and other agrochemical products was the highest for the last five years - 11 465 mln.tonnes

Thus, development of the industry and agriculture in Kazakhstan shows steady positive dynamics. The government of the Republic of Kazakhstan pays much attention to development of economic branches data that has a positive impact on their growth.

1.1.4 Environmentoverview

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 3.

Table 3 – 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	Presenceofhazardousc hemicalsinfood	National	High	Pesticides, nitrates	1
3	Drinking water contamination	National	High	Heavy metals, petroleum products	1
4	Recycling / destruction of hazardous wastes	National	High	Radioactivewaste, obsoletepesticides, 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, compressedgases	2
15	Illegal imports of unknown chemicals	Local	Medium	Narcotic, flammablesubstances	2
16	Industrial POPs	National	Medium	Newsubstancesunderthe StockholmConvention, PCBs (PCTs)	2
17	Pollution of the seas and lakes	Transboundary	Medium	Petroleum products, pesticides, heavy metals, PCBs	3

Note:
1: Source: NationalprofileonchemicalsmanagementintheRepublicofKazakhstan, 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 Environmentalpolicy, sustainabledevelopmentpolicyandgeneral 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 placesenvironmental 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",Government of RoK approved the Plan of activities on implementation of the Concept for 2013 - 2020. The plan includes the actions directed to the solution of urgent problems in the field of rational use of natural resources and environment protection.

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 4presents 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 4 – 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							+	
Committeeonemergencysituationsof the Ministry of internal affairs				+				
Committee of customs control of the Ministry of finance		+	+	+				
Manufacturingsector, industrialassociations	+	+	+	+	+		+	+
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.

Implementation of obligations according to the Stockholm convention on POPs is carried out by implementation of joint international projects, development of the current NIP and planned activities implementation for the purpose of decrease in impact of POPs on human health and the environment.

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№212;
- Labour Code of October23, 2015 № 414-V З RoK;
- Code of the Republic of Kazakhstan dated September 18, 2009 № 193-IV «On people's health and the healthcare system;
- Criminal Code of 3 July 2014№ 226-V З RoK;
- Code "On taxes and other obligatory payments to the budget" of December 10, 2008, № 99-IV (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.

The changes directed to improvement of mechanisms of environmental protection, including implementation of obligations under the Stockholm convention and safe handling of POPs which have been brought in 2012 were repeatedly made in the Environmental Code . The current version of the Environmental Code regarding regulation of POPs establishes:

- Definition of POPs as 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 (Article 1);

- Competenceof the authorized body in the field of environmental protection in relation to state management of hazardous chemicals, including persistent organic pollutants, as part of the obligations of international treaties of the Republic of Kazakhstan onpersistent organic pollutants, on monitoring over cross-border transportation of dangerous wastes and its deleting and on the procedure of preliminary reasonable consent concerning separate dangerous chemicals and pesticides in international trade(Article 17);
- ban of production, application, import and disposal of pesticides and other production containing persistent organic pollutants and also production by using which wastes with POPs can be formed (article 239);
- ban of production and import of POPs-containing production or as a result of use they are formed (article 280);
- ban of technologies use for destruction of POPs and chlorine-containing wastes without complex waste gas system which shall provide the content of dioxine and furan in cleared flue gases in concentration not higher than 0,1 ng/m3 (article 280);
- ban of POPs use in the places connected to production and processing of food or forages (article 280);
- requirements in case of waste storage containing persistent organic pollutants (article 293-1);
- prohibition of waste disposal of POPs (article 298);
- need of development of the POPs recycling program (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 and labeling of PCB-containing wastes;
5) organization of storage and transportation of PCB-containing wastes;

These Rules require conduction of an inventory of oil-filled electrical equipment for contamination with PCBs. 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**.**

Currently changes and additions are made in the text of Specification of the persistent organic pollutants and waste containing them.

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.

For enterprises support, controlling public authorities and all stakeholders the guides to various aspects of handling with POPs and PCB in particular have been developed. The following guides:

1. PCBManagementGuideline
2. Model PCB Management Plan for enterprises, owners of PCB equipment
3. Guidelines for the temporary storage of PCB-containing equipment and wastes
4. Review of PCB disposal technologies
5. Guidelines for Risk Assessment of PCB contaminated areas

6. Apracticalguideforriskassessment on the enterprises with PCB-containing equipment and wastes

The specified guidelines help enterprises and public authorities to improve handling system with PCB-containing equipment and PCB-containing wastes.

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, and POPs as well.

TheLawestablishesrequirementsonimplementationofriskassessmentsoftheproductsregistratio n in authorized body and providing chemical production with safety certificate which contains full information on risks of production use and measures of safe handling. Registration of chemicals is an obligation of the company of the producer (either the supplier, or the importer). The procedure of registration of chemical production includes obligatory development of the safety certificate which has to be developed according to the national standard. ST RK 1185

For the period from 2014 till 2016 626 safety certificates of chemical production on 553 types of production were registered. However, not all producers (suppliers or importers) meet requirements of the legislation in the field of registration of chemical production. This situation leads to the fact that in the Kazakhstan market there is chemical production which wasn't registered by authorized body and without safety certificate. More often such production contains the dangerous chemicals including persistent organic pollutants (POPs).

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.

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 phytosanitary 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.

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.

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 № 4-4/61 dated January 30,2015 "On the approval of Conducting Rules of registration, production tests and state registration of pesticides (toxic chemicals)". Among the documents necessary for pesticides registration and inclusion it in thepermitted for use list, it is essential to provide letters from authorized body in the field of sanitary and epidemiological safety of population and authorized body in the field of environmental protection confirming that the pesticide (toxic chemical) declared to registration tests isn't entered to the plant protection products list,forbidden to import to the customs territory of the Customs union,under the action of annexes A and B of Stockholm convention on persistent organic pollutants dated May 22, 2001. This list is approved by the Euroasian economic commission Board Decision dated April 21, 2015 No. 30 "On measures of non-tariff regulation" (Annex 1, section 1.4 "Plant protection products and other persistent organic pollutants, being in the embargo list"). There are ten items included in this list (aldrin, chlordan, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, kamfekhlor (toxaphene), PCB and DDT). Import of POPs containing pesticides is banned in Kazakhstan since 1987.

Within implementation of the Law "On Plant Protection" the order of the Minister of Agriculture of RK dated September 29, 2015 No. 15-05/864 has approved "Rules of neutralization of pesticides (toxic chemicals)". Rules establish an order of neutralization of pesticides (toxic chemicals) under which safe storage with the subsequent utilization or destruction is supposed. Storage of unwanted pesticides (toxic chemicals) and a packaging from them is made in special storages (burials). In Rules requirements to the storages are established. For violation of Rules, perpetrators are brought to administrative responsibility according to the Code of RK "On Administrative Offences".

Besides, within implementation of legislative requirements there are a number of by-laws in the field of pesticides:

- The order of the Minister of Agriculture of RK dated September 23, 2015 No. 15-05/844 "On the approval of the standard of stock by pesticides types (toxic chemicals) and Rules of its use";
- The order of the Minister of Agriculture of RK dated February 27, 2015 No. 4-4/176 "On the approval of Rules of reserve creation of pesticides (toxic chemicals) for conducting actions on the quarantine of plants";
- The order of the Minister of Agriculture of RK dated June 24, 2015 No. 15-1/565 "On the approval of the standard of state service "State Registration of Pesticides (Toxic Chemicals)";
- The order of the Minister of Agriculture of RK dated September 9, 2015 No. 15-02/811 "On the approval of regulations of the state service "State Registration of Pesticides (Toxic Chemicals)";
- The order of the Minister of Agriculture of RK dated July 15, 2015 No. 15-02/655 "On the approval of the standard of the state service "Licensing for Implementation of Activity for Production (Formulization) of Pesticides (Toxic Chemicals), Realization of Pesticides (Toxic Chemicals), Use of Pesticides (Toxic Chemicals) by Aerosol and fumigation Ways".Law of the Republic of Kazakhstan "On permissions and notifications" defines an exhaustive list of activities in the Republic of Kazakhstan, requiring a license. 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.

Thus, the legislation of RK in the field of persistent organic pollutants partially regulates issues of safe handling with PCB, pesticides. However modification and additions concerning new POPs, inventory and safe handling with industrial, unintentionally produced POPs and POP-containing wastes are required.

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

To decrease negative impact 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. In general, Kazakhstan tries to follow the international recommendations regarding application of approaches and procedures for POPs.

However, today some problems remain unsolved 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 POPs-pesticides

1.3.1.1 Evaluation of obsolete pesticides containing POPs

Currently, 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 producedin Kazakhstan, and currently they are not imported or exported. Export and import of POPs-pesticides is banned according to the legislation of RK.However, significant quantities of previously produced POPs and used in the former USSR are accumulated on the territory of Kazakhstan.

With the reduction of agricultural landsin 2011 – 2015 (Table 5), the volumes of the use of chemical plant protection products have not reduced. Therefore specific introduction of pesticides by 1 ha of farmlands has increased almost twice (from 0, 29 kg/ha in 2011 to 0,52 kg/ha in 2015).The annual volume of introduced pesticides in a given period is within 10-11 thousands tones.

In total for the last five years 51 154,7 tons of pesticides have been brought. As a part of the applied pesticides is possible to find pesticides relating to new POPs which have been forbidden in 2009-2011.

Table 5 – Total volume of applied pesticides during the period of 2011-2015

№	Name	2011	2012	2013	2014	2015
1	Insecticides, tones	449,2	410,2	632,4	645,4	524,7
2	Herbicidesanddesiccants, tons	9 314,8	7 719,7	7 245,6	9 421,4	8 706,5
3	Fungicides and bactericides, tons	853,4	426,6	509,0	812,0	674,5
4	Plant hormones, tons	13,9	98,4	331,7	262,2	99,4

5	Rodenticides, tons	25,3	19,68	19,68	17,77	7,2
6	Others, tons	-	-	-	-	576,6
7	Totalintroducedvolume (all pesticides), tons	10 656,6	8 564,9	9 661,6	11 158,7	11 112,9
8	Total area of agricultural lands, 1000 ha	36 226,1	21 494,8	21 372,4	24 876,9	21 205,0
9	Introduction of pesticides per unit area, kg/ha	0,294	0,398	0,452	0,449	0,524

Note:

Source: Statistical collection "Environmental Protection and Sustainable Development of Kazakhstan", Committee on statistics of the Ministry of national economy of the Republic of Kazakhstan, 2011-2015, Astana 2016

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.

Following the results of preliminary inventory of POPs in Kazakhstan within the UNDP/GEF project "The initial assistance to the Republic of Kazakhstan on implementation of obligations under the Stockholm convention on POPs" in the territory of RK there are 727 warehouses and 15 burials containing pesticides (Figure 1), (Table 6).

Preliminary inventory of POPs-pesticides in 2003 has shown existence in warehouses of the following pesticides:

- there are 15 tons of toxaphene in Akkainsky region of the North Kazakhstan;
- there are 24 tons of HCH (the new POPs-pesticide added to the POPs list in 2009) at the Protivochumny station in the Atyrau oblast;
- there are 0,5 tons of DDT near the Zhangiz-Tyube village, Zharminsky Region of East Kazakhstan oblast;.

Figure 1 - Burials of pesticides of Kazakhstan

In the figure 1 the arrangement of burials of pesticides in Kazakhstan is shown (according to data of 2010).

Table6–Information on the quantityof storage warehouses, burials,obsoleteandunwanted pesticides and packagingfromthemat 2008, in RK

Oblast	Quantityof storage warehouses		Quantityof burials		Quantityofobsolete and unwanted toxic chemicals, tons	Quantityofpackaging from pesticides, units, tons
	total	existing	closed	existing		
Akmola	228	228	2	1	12,3	14033
Aktobe	40	-	-	-	-	-
Almaty	84	12	2	-	1,65	150
Atyrau	1	1	-	-	-	0,5 т
EKO	63	50	1	-	61,05	5923
Zhambyl	15	-	-	-	-	-
WKO	3	3	-	1	11,4	1306
Karaganda	4	4	4	-	-	-
Kostanay	248	236	-	1	13,741	2,059 т
Kyzylorda	1	1	-	-	-	6344
Pavlodar	21	-	1	1	5	2550
NKO	9	2	1	-	-	-
Mangystau	-	-	-	-	-	-
SKO	10	7	-	-	-	-
TOTAL	**727**	**544**	**11**	**4**	**105,141**	**30306 units+ 2,559 t**

According to data of the Ministry of Energy dated April, 2014 the total of the obsolete pesticides stored on various objects of Kazakhstan has reached 1 617 637,75 kg (l) and a packaging from them more than 169 660 units (Table 7).

Table 7 - Information on quantity of warehouses and obsolete and unwanted pesticides and packaging from them dated April, 2014 in RK

Oblast	Obsolete, prohibited, unwanted pesticides, kg(l)	Pesticide storagewarehouses			Buried pesticide, kg(l)	Packaging, units.	
		Typical, units.	Adapted, units	Total quantity		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**	**1 256 763**	**169660**	**76408**

Comparing 6 and 7 tables data it is possible to see that the amount of obsolete and unwanted pesticides has considerably increased that can be connected with detection of new sites of obsolete pesticides and packaging from them.

It should be noted that the submitted data on obsolete pesticides don't reflect real condition, and require more detailed and serious assessment of the available reserves of obsolete pesticides among which there can be POPs-pesticides. The most part of revealed obsolete pesticides contain mixtures of unknown composition, needing identification.

1.3.1.2Evaluationof pesticides, containing new POPs (2009 and 2011)

The majority of new POPs included in the list of the Stockholm convention in 2009 and 2011 are pesticides. There are alpha- and beta- hexachlorocyclohexane, lindane, chlordecone and endosulfan. Summary of the new POPs - pesticides is provided in table 8.

Table 8 - Description of new POPs-pesticides

№	POPs name	Sector	Production / process
1.	Alpha- and beta-hexachlorocyclohexane	Agriculture	Pesticides
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.
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
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

Alpha-hexachlorocyclohexane and *beta-hexachlorocyclohexane*are the isomers of lindane that are formed as waste during its production. For every tonneof 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 from them, though not exhibit specific insecticidal properties.

The lindane is an organochlorine pesticide which was used for fight against different types of insects since the beginning of 1950. It is rather flying and steady pesticide which accumulates in human and animals adipose tissues. The lindane is used for fight against agricultural pests, for the sanitary or "pharmaceutical" purposes. Besides, it is applied to insecticidal processing of such materials as wood, skin, wool and cotton.

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.

Except specified substances, pentachlorobenzene was also applied as pesticide

It is known that chlorinated organic pesticides in the USSR were produced mainly in Dzerzhinsk and Chapayevsk. General information about production of pesticides which are recognized as POP-containing in 2009 and 2011 is presented in table 9.

Table9– Production of pesticides containing new POPs in the USSR

№ п/п	Pesticide name	Production in USSR, years
1	Alpha hexachlorocyclohexane	Was produced as part of the technical and enriched HCH
2	Beta hexachlorocyclohexane	Was produced as part of the technical and enriched HCH
3	Lindane (gamma-hexachlorocyclohexane))	Was produced as part of the technical and enriched HCH
4	Chlordecone	Was not produced
5	Pentachlorobenzene	Was not produced

DataonthevolumeofproducedPOPs-pesticidesare absent.

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.

The lindane was used as an insecticide. Lindane in the USSR wasn't produced directly, however the technical and enriched HCH was produced in Chapayevsk of Samara oblast. After 1990 production has been stopped.

Chlordecone wasn't produced and used in the USSR.

Pentachlorobenzene was used as pesticide and antipyrene, and also together with PCB in dielectric liquids in the electrotechnical equipment. It was used as an intermediate product for production of pentachloronitrobenzene (quintozen) pesticide. Pentachlorobenzene wasn't produced in the USSR.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.

For full assessment of Kazakhstan pollution by new POPs-pesticides and measures definition for solution of existing problems it is necessary to carry out detailed inventory of new POPs, including laboratory analyses implementation.

1.3.2PCB evaluation

Stocks of pure polychlorbiphenyls and oils on their basis (sovol, sovtol, etc.) in the territory of the Republic of Kazakhstan are absent. The remains of trichlorodiphenyl at the Ust-Kamenogorsk condenser plant and production wastes of the plant in 1989-1991 have been buried in containment pond of plant

There is a significant amount of equipment containing PCB on the territory of Kazakhstan.

Transformers. As a part of inventory in 2003 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 Karagaand 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 capacitors are still at the “Darial-U” storage.

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 revealedat 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.

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 decommissionedcapacitorsareattheJSC "KazZinc".

According to Specification of the persistent organic pollutants and wastes containing them, approved Order of the Minister of environmental protection of RK dated February 24, 2012 No. 40-ө, owners of PCB-containing equipment and wastes implement inventory of such equipment, including laboratory researches. By results of the carried-out inventory the updated account register of PCB-containing equipment is provided annually in authorized body of environmental protection in the oblast.

In table 10 preliminary data of existing PCB-equipment in RK by data for 2015 are provided.

Table10 – Information on the existence of PCB-containing equipment in the Republic of Kazakhstan (2015)

№ п/п	Name	Revealed, units	Neutralized, units	Buried, units	Remains, including exploitation, units
1	Transformers	166	33	0	133
2	Capacitors	52 861	12452	14865	25544
3	Capacitor unit	78	0	0	78
	Total	**53 105**	**25 936**	**14865**	**25755**

Obsolete capacitors and soil polluted by PCB is to be eliminated according to safety requirements.

In the field of management, storages and elimination of equipment and wastes containing PCB for Kazakhstan the following problems are urgent today:

1. The control system, monitoring and control PCB-containing equipment isn't adjusted.
2. The regulatory base on ecologically safe management of the operated equipment (rules,instructions) requires improvement.
3. Insufficient potential of staff which can implement monitoring and control of operation of the equipment at the enterprise and from supervisory authorities.
4. There are no specialized warehouses for temporary storage of PCB-containing equipment and wastes.
5. There are no technologies for elimination of materials and wastes containing POPs.

1.3.3 Evaluationofpolybrominateddiphenylsethers andhexabromobiphenyl

Polybrominated diphenyls ethers including in the list of Stockholm Convention in 2009 contain ofoctabrombiphenyl ether (octa-BDE)and pentabrombiphenyl ether (penta-BDE).

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 applicationarea 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.

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.
Information on sectors and application areas of polybrominated diphenyls ethers and hexabromobiphenyl is given in the table 11.

Table11 - Applicationareasofpolybrominateddiphenylsethers and hexabromobiphenyl

№	POPs name	Sector	Production / process
1	Octabromodiphenyl ether	Light industry Mechanical engineering	- fireproof plastic products - used in ABS - partial production of high impact polystyrene, polybutylene terephthalate (PBT) and polyamide polymers
2	Pentabromodiphenyl ether	Electronics and electrical engineering Mechanical engineering ConstructionMaterials 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.
3	Hexabromobiphenyl	ConstructionMaterials Electronics and electrical engineering Mechanical 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 (eg, radio and TV); - fire retardant coatings and lacquers; - production of polyurethane foam for auto upholstery

ForPBDEassessment in the Republic of Kazakhstan and development of the corresponding activities on the problems solution, connected with PBDE, the inventory of equipment, which can potentially contain these substances, was implemented.

Thecalculation ofPBDEwasexecutedaccordingtoGuideline on inventory of polybrominated diphenyls ethers, involving in the list of Stockholm Convention on persistent organic pollutants (2012)[1].

As PBDE were used in production of wide range of consumer goods, inventory was carried out on the most significant sectors:

• Electrotechnical and electronic equipment;
• Vehicles;
• Soft furniture and seat furniture

Electronic industry

ABS plastic in the casing of monitors and TV sets with the cathode ray tube potentially can contain octa-BDE.

Considering that ABS plastic, CRTs casing of monitors and TV sets weren't produced in Kazakhstan, its arrival in the Republic of Kazakhstan was carried out due to import, since 1990th years. Today the considerable part of the equipment which potentially can contain PBDE is replaced by new one, and the most part of the electronic equipment got on SMW.

Calculated in compliance with the international calculation procedure contents of p-okta-BDE in CRTs monitors and TV sets, values are given below in table 12.

Table 12 – Calculation of PBDE contents in electronic production

№ п/п	Products name	Total amount, units	ABS volumeplastic, tons	Octa-BDE volume, tons
1	Monitors	3 000 000	13 500	34, 3
2	TV sets on number of households	4 391 759	32 938	28,7
3	Refrigerators and deep freezes	1 256 788	24 507,4	21,3
	Total			**84,3**

2. Transport industry

The quantity of penta-BDE in polyurethane of vehicles calculated according to procedure is presented in table 13.

As PBDE relating to POPs were made and used approximately from 1975 till 2004, within inventory of PBDE relating to POPs, only those vehicles which were made during the specified period are subject to the account. According to data on the registered cars the number of cars till 2005 production year for January 1, 2015 is 3,2 million pieces.Рассчитанноевсоответствиисметодикойколичествопента-БДЭвполиуретанетранспортныхсредствпредставленовтаблице 13.

Table 13 – Quantity of PBDE in the vehicles on January 1, 2015

№ п\п	Type of vehicle	Quantity, pcs	Volumeof polyurethane, tons	Volume of PBDE, tons

[1] Guideline on inventory of polybrominated diphenyls ethers, involving in the list of Stockholm Convention on persistent organic pollutants, July 2012 (https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiiqLerjYHNAhWLlCwKHdzrA_QQFggcMAA&url=http%3A%2F%2Fchm.pops.int%2FPortals%2F0%2Fdownload.aspx%3Fd%3DUNEP-POPS-NIP-GUID-InventoryPBDE.Ru.pdf&usg=AFQjCNEgAf15TVINlIls8-mUNgaCufpQvQ&sig2=GsZcfSDcHkkPygBi-OFv0A&bvm=bv.123325700,d.bGg)

1	Cars,productiontill 2005	3206008	51296, 13	512,96
2	Lorries	430595	6889,5	68,90
3	Buses	98810	9881	98,8
4	Carriages	2214 95000 мест	456	12,6
Total				**693,2**

3. Furniture polyurethane

The analysis of Customs declarations and Statistical collections shows that the volume of imported soft furniture is presented by several types of goods, exactly: sofas, wooden chairs, metal chairs, office chairs, matresses.

According to customs declarations calculation of penta-BDE was also carried out due to the international methodology. At the same time the volume of polyurethane was defined on the base of average numbers of the foam rubber sizes in each type of products.

Data on PBDE volume in furniture and matresses are presented in table 14.

Table 14 –Quantity of penta-BDE in the furniture and matresses

№	**Type of soft furniture**	**Quantity, pcs**	**Volumeof polyurethane in one unit,m^3**	**Total amount of polyurethanein furniture, tons**	**Contents of penta BDE, tons**
1	Sofas	168 550	0,32	1564,144	43,327
2	Wooden chairs	2 723 373	0,006	473,867	13,126
3	Metal chairs (office)	3 891 115	0,007	789,896	21,880
4	Office chairs	1 051 666	0,01	304,983	8,448
5	Matresses	592 278	0,05	858,803	23,789
	Total				**110,57**

Data on the total amount of PBDE in three chosen fields are presented in table 15.

Table15 – Preliminary data on inventories of PBDE in Kazakhstan

№	**PBDE application field**	**PBDE volume, tons**
1	Monitors	84,3
2	TV sets on number of households	693,2
3	Refrigerators and deep freezes	110,57
	Total	**888,07**

Thus, according to preliminary data (without implementation of PBDE analytical definition in the equipment and goods) in the Republic of Kazakhstan dated January 1, 2015 the volume of PBDE is 888,07 tons. It should be noted that it is data obtained only in calculating way, and implementation of selective analyses is required further to define the contents and quantity of PBDE-containing products.

1.3.4 DDT evaluation

Chemicals of restricted use are listed in Annex B of Stockholm Convention. 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 nationwide organization "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.

1.3.5 Evaluation of perfluorooctanoic sulfonic acid, its salt and perfluorooctanoic sulfonyl fluorides

Perfluorooctanoic sulfonateis as intentionally produced and unintentional product of decay of the related anthropogenous chemicals. PFOS was included in the list of the Stockholm convention in 2009. PFOS and related chemicals, are used or were used in chemical and light industry by production: electrical and electronic components, fire-prevention foam, carpets, leather clothes, textiles, upholstery fabric, pesticides and other insecticides, photographic industry, photolithography and production of semiconductors, pressure fluids and the electroplated coatings.

PFOS was used in the manufacture of production that includes, but isn't limited to the following types:

- foam for fire extinguishing;
- carpets;
- skins / clothes;
- textiles / upholstery;
- paper and packing;
- coverings and additives;
- industrial and household chemicals;
- polishes for floors;
- cleanings of dentures;
- shampoos;
- photoindustry;
- anti-erosive reagent;
- antiglare covering;
- surfactant;
- hydraulic liquids;
- metal coatings.

PFOS is still produced in some countries.

For assessment of PFOS volumes in the Republic of Kazakhstan inventory of goods which can contain potentially PFOS was implemented. Inventory was carried out according to the Guideline on inventory of perfluorooctanoic sulfonic acid (PFOS) and related chemicals that were

included in the Stockholm convention on persistent organic pollutants (2012)[2].

Considering a wide range of PFOS use in the industry, for initial inventory the most significant products by production of which PFOS was used have been chosen:

• fire extinguishers;

• carpeting.

1. Fire extinguishers

Calculations of PFOS content in fire extinguishers were carried out on the base of filler weight is 60%, and PFOS content in a powder filler can be up to 1,5%.

Table 16 – The content of PFOS in fire extinguishers

Product	Quantity, pcs	Weight of all fire extinguishers, tons	Weight of filler, tons	Volume of PFOS, tons
Fire extinguishers	1 832 052	11 210,7	6 726,4	100,89

Potentially possible PFOS content in the fire extinguishers delivered over the last 10 years is 100,89 tons (table 16).

1. Carpeting

Preliminary calculation of PFOS content in carpeting is presented in table 17. Calculation of PFOS content in carpeting was carried out proceeding from situation that products contain 0,03% of PFOS.

Table 17 – The content of PFOS in carpeting

Years	Carpets and other textile floor coverings, tons (net weight)	Carpets and other textile floor coverings, pcs	Content of PFOS, tons
2005	3 767	2 703 198	1,1301
2006	4 001	2 892 617	1,2003
2007	3 817	2 743 427	1,1451
2008	6 154	3 007 437	1,8462
2009	8 343	3 444 380	2,5029
2010	16 458	6 050 403	4,9374
2011	17 102	7 723 178	5,1306
2012	22 183	11 318 488	6,6549
2013	22 683	11 896 662	6,8049
2014	17 169	8 984 872	5,1507
Итого	**121 677**	**60 764 662**	**36,5031**

Data on the preliminary inventory of PFOS in Kazakhstan are given in table 18.

[2]Guideline on inventory of perfluorooctanoic sulfonic acid (PFOS) and related chemicals that were included in the Stockholm convention on persistent organic pollutants, project, July, 2012 (https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwi2_6-QjoHNAhVEfiwKHScoCZkQFggcMAA&url=http%3A%2F%2Fchm.pops.int%2FPortals%2F0%2Fdownload.aspx%3Fd%3DUNEP-POPS-NIP-GUID-InventoryPFOS.Ru.doc&usg=AFQjCNHVuOu5Y62gbb7iEwmGKaQfjCn7oA&sig2=4R5OqH4SUbc_GDTt5MPBqw&bvm=bv.123325700,d.bGg)

Table 18 – Preliminary data of PFOS inventory in Kazakhstan

№	PFOS application field	PFOS volume, tons
1	Fire extinguisher	100,89
2	Carpeting	36,50
	Total	**137, 39**

Thus, the total amount of PFOS in carpets and fire extinguishers is 137,39 tons. Also it should be noted that these data are obtained in the calculating way and require specification after selective analyses implementation of production on the PFOS content.

1.3.6EvaluationofreleasesofunintentionallyproducedPOPs

1.3.6.1 Evaluation of dioxine, furan and hexachlorobenzene

Dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF or dioxins and furans), 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. Potential source of emissions of dioxins and furans in ferrous metallurgy is agglomeration.In Kazakhstan the ferrous metallurgy is represented by the production enterprises: JSC "ArselorMittal Temirtau", JSC "Sokolovsko-sarbaysky mining and processing production association". The volume of the produced iron-ore agglomerate by data for 2015 was 16 288, 900 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 JSC

"ArselorMittal 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. The annual volume of coke, including semi-coke from coal, lignite or peat, retort coal, in 2015 was 2628,1 thousand tons.

Foundry production. In Kazakhstan pig iron and steel are produced in one enterprise – JSC "ArselorMittal Temirtau". Foundry production exists in many enterprises of mining and metallurgical and engineering complex. An annual volume of the product in 2015 waspig iron and steel – 7647,7 thousand tons, foundry production – 43,2 thousand tons.

Copper production. 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 official data, there are no enterprises producing remelt copper in the country.

. In copper melting plants of LLP "Corporation "KazakhMyz" 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.

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

In 2015 thevolume of copper was 394,6 thousand tons.

Aluminium production. There is no production of primary and secondary aluminium in the republic, but several enterprises produce cast aluminium. In 2015 production volume of aluminum raw and oxide of aluminum was1 670,2 thousand tons.

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 JSC “Industrial corporation “SouthPolymetal”” 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. 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. The volume of raw lead in 2015 was 120,1 thousand tons.

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: JSC "KazZinc", LLP «Shalkiyazinc» и «KAZ Minerals PLC».

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. The volume of raw zinc in 2015 was 323,8 thousand tons.

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. LLP “ZOZM” 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. Data on volume production of brass and bronze is absent.

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. Data on volume production of magnesium are absent.

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.According to official statistics the volume of lime in Kazakhstan in 2015 was 870,7 thousand tons.

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. According to official statistics the volume of bricks in Kazakhstan in 2015 was 1039,8 thousand tons.

Asphalt-concrete production

Production of asphalt can be a source of dioxins and furans. Small plants producing asphalt exist in many oblast centers. Data on the volume production is absent.

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.According to official statistics the volume of textile production in Kazakhstan was 51,3 thousand tons.

Residential heating and meal preparation

The majority of private households in the country are heated with coal. In 2015according to data of fuel and energy balance of RK in households has been burned 143 800 tons of coal, 88 100 tons of oil fuel and 720 600 tons of gas.

Open waste incineration

According to Environmental Code of RK unauthorized incineration of municipal waste isn't allowed. However, actually cases of open waste incineration happen. Data on volumes of open waste incineration – is absent.

Solid municipal wastes.

The majority of SMW in Kazakhstan are stored on open grounds near settlements. There are no data on volumes of the stored garbage on city and industrial dumps. There are self-ignitions on many of them. There is no data on the fires on grounds.

Hazardous wastes Hazardous wastes of the industrial enterprises in Kazakhstan are stored in the special industrial grounds. Incineration of hazardous wastes is carried out at some enterprises. There isn’t any exact data on volumes.

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 at the dumps of SMW.

Incineration of wood and biomass wastes.The majority of wood-processing enterprises, that worked during the soviet regime, are liquidated 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. In 2015 476 cases of wildfires which have captured the area – 9 614 ha have been recorded.

Incineration of wastes and spontaneous fires

There is no data on the volume of burnt materials and fires.

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. There is no data on the volume

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). According to official statistics the volume of cigarettes in 2015 was – 19 615 million pieces.

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. There is no data on composting.

Oil waste treatment. According to statistical data for the last years in Kazakhstan over 150 thousand tons of technical oils are consumed. Many large enterprises have areas on regeneration of transformer and hydraulic oils. Engine oils are generally burned in kilns of the enterprises and private houses.There is no data on volume of the used oil.

According to results of U-POPs releases inventory implemented in accordance with Methodical guide of UNEP on detection and quantitative assessment of releases of dioxins, furans and other unintentionally produced persistent organic pollutants, the volume of U-POPs releases in the Republic of Kazakhstan for 2015 was 3 275 g TE per year. The maximum releases are received for categories "Production of Ferrous and Non-ferrous Metals" (1352,7 g TE per year) and "Production of the of power and heat energy" (1546,7 g TE per year). At the same time maximum arrival in air is specific for category "Production of Ferrous and Non-ferrous Metals" (903,9 g TE per year), arrival in wastes – for category "Production of the of power and heat energy" (898,1 g TE per year). Also it is necessary to select category "High-temperature incineration of wastes" and rather high rate of releases in the air (124,9 g TE per year).

The main environments where U-POPs and new POPs placed as result of releases,are air and wastes. Besides, they can get into water (categories "Production of Ferrous and Non-ferrous Metals" and "Disposal") and production (category "Production of Goodsof Mineral Raw Materials").

Implementation results of U-POPs releases inventory for 2015 on the base of data on production presented in official statistics are given in table 19.

Table19 - Results of U-POPs releases inventory for 2015

Group	Sector	Annual releases, g-TE/year				
		Air	Water	Soil	Production	Wastes
1	High-temperature incineration	124,9	0,0	0,0	0,0	0,7

	of wastes					
2	Production of ferrous and nonferrous metals	903,9	0,2	0,0	0,0	448,8
3	Production of power and heat energy	648,6	0,0	0,0	0,0	898,1
4	Production of goods of mineral raw materials	85,4	0,0	0,0	0,1	0,0
5	Vehicles	11,3	0,0	0,0	0,0	0,0
6	Uncontrolled processes of incineration	0,0	0,0	0,0	0,0	0,0
7	Production and use of chemicals and consumer goods	5,6	0,0	0,0	0,0	0,0
8	Other	0,0	0,0	0,0	0,0	0,0
9	Disposal	0,0	1,2	0,0	0,0	146,7
10	Definition of potential hot spots				0,0	0,0
1-10	Total:	1779,7	1,4	0,0	0,1	1494,3
	Total:	**3275**				

Implemented inventory of U-POPs on the base of data of official statistics has defined approximate values of U-POPs releases.

Further it is planned to carry out inventory of U-POPs annually. At the same time inventory will be conducted by the enterprises independently with the subsequent delivery of the report in corresponding form to authorized body under environmental protection.

1.3.6.2 Evaluation of pentachlorobenzene

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) and placed as an alloy in the fungicide.

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.

It isn't possible to carry out an assessment of pollution of the territory of the Republic of Kazakhstan by pentachlorobenzene at this stage because of the lack of international recommendations and managements. Unintentional releases of pentachlorobenzene are considered during U-POPs inventory implementation.

1.3.7Data on awareness of stockpiles, polluted areas and wastes

Today there are no full and reliable data on the territories and sites polluted by POPs in Kazakhstan. 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.

At the Pavlodar chemical plant earlier there was a production of cable and shoe plastic compound on the basis of polyvinylchloride. Due to technology polychlorinated biphenyl was applied as the heat carrier in the reactor heating system on production of polyvinylchloride shoe and cable plastic compound. The volume of used polychlorinated biphenyls was about 6 m3, today stocks don't exceed 1,0-1,5 m3. Now it is unknown where there is a missing polychlorinated biphenyl. The remains of polychlorinated biphenyl and polluted equipment should be utilized.

5. Sites of former military bases in Northern Balkash territory.
6. Sites of the power substation in Kostanai.
7. Derzhavinsky ground of military equipment destruction (PCB).
8. Zhangiztobinsky ground of military equipment destruction (PCB).

Within the project of the World Bank on grant of the Canadian trust fund "Inspection and offers on collecting and destruction of stocks and wastes of obsolete pesticides and polychlorinated biphenyls in Kazakhstan" in 2009 6 more sites polluted by POPs were revealed.

1. Zhetekshy (Pavlodar), pesticides warehouse territory
2. Derzhavinsk 2, former military fuel warehouse
3. Derzhavinsk 3, former military electric substation,
4. Dzerzhavinsk agricultural complex, pesticides
5. Zhety aul (Pavlodar), pesticides rural warehouse territory
6. Kalkaman (Pavlodar), pesticides burials territory

Later the site polluted by fertilizers and pesticides in the Leninsk settlement of Pavlodar oblast has been found.

Researches of 2009-2010 have shown that in tests of soil of Kostanay substation, Derzhavinsky and Zhangistobinsky grounds PCB aren't revealed, respectively these sites can be excluded from the list of the polluted sites.

Now construction of plant on destruction of dangerous wastes is planned in Kazakhstan. Government of RK has discussed with the World Bank an issue of loan within modernization of waste control system. It is planned that the plant meeting the international standards will destroy dangerous wastes, including POPs, and polluted soil as well.

1.3.8CurrentprogramsofmonitoringofPOPsreleases, including results

In Kazakhstan an issue of the POPs releases monitoring is extremely urgent. In Kazakhstan POPs monitoring system, including new POPs, isn't adjusted.

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.However,"KazHydroMet" RSE doesn't implement definition of the chemicals – POPs through all territory of 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. However, the list of substances for which the production environmental control and monitoring is carried out is limited and does not include POPs.

According to the Environmental Code and bylaws, enterprises and organizations have to carry out the accounting of education, storage, utilization and processing of wastes, and also transfer to their specialized enterprises. Within providing report on inventory of wastes in authorized body in the field of environmental protection companies provide information on the wastes containing polychlorinated biphenyl, polychlorinatedterphenyls, polybrominated biphenyl (and also any polybrominated analogs of these connections).

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 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.

Apparently, systematic monitoring of POPs in the environment and consumer goods in Kazakhstan isn't implemented. But, nevertheless, in scientific literature and within the separate

researches and projects there are some data on the POPs content in various environments.

Monitoring of POP-pesticides new POP-pesticides

According to Global monitoring of POPs in the territory of Atyrau city and resort area Borovoe such POP-pesticides as HCB, PCB, DDT, beta-HCH, lindane have been found. PCB, beta-HCH and lindane belong to new POP-pesticides

In 2009-2010 the Ministry of environmental protection (nowadays the Ministry of Energy of RK) together with the World Bank has developed the project within which 4 centers of potential content of POP-pesticides and new POP-pesticides have been investigated. As a result of researches it has been established:

- in Zhetekshy villahe of the Pavlodar oblast in pesticides warehouse and in pesticides dump in the Kalkaman village of Pavlodar oblast concentration of HCB and gamma-HCH exceed the norms established for the purpose of human health protection;

- in Derzhavinsky agricultural complex of Akmola oblast and in pesticides warehouse of in the Aul No. 7 of Pavlodar oblast the POPs levels didn't exceed the norm posing potential threat.

Within the program 039 "Development of hydrometeorological monitoring" of the subprogramme 100 "Observations implementation over environmental condition" branch of RSE "KazHydromet" on the North Kazakhstan oblast since 2014 executes monthly determination of pesticides concentration (alpha, gamma-HCH, 4,4 – DDT and 4,4 – DDE) on 2 water objects (Esil river and Sergeevskiy water reservoir).

In 2015 within the scientific and technical program "Integrated Approaches in Health control of Population in Priaral" researches on determination of residual amounts of organochlorine pesticides, the polychlorinated biphenyls, dioxine in a soil layer of the earth and ground deposits of five regions of the Kyzylorda oblast were conducted: Ayteke-Bi village, Zhosala village, Aralsk, Zhalagash village, Shiyeli village. Organochlorine pesticides were found in four from five settlements – Zhosala village, Zhalagash village, Ayteke Bi village, Shiili village. Biggest pollution by organochlorine pesticides of 12 of 22 tests – 54,5% was registered in Zhosala village where 10 tests of gamma-HCH and 2 samples of DDT were revealed.

In 2016 RSE "KazHydromet" have conducted researches of pesticides content (alpha, gamma-HCH, 4,4 – DDT and 4,4 – DDE) in water surface of rivers Ily, Tekes, Horgos, Kara-Ertis and Emel during the vegetative period (June, July, August). By results of implemented analyses pesticides of alpha, gamma-HCH, 4,4 – DDT and 4,4 – DDE in samples of water selected tests were absent.

On the base of the agreement concluded between UNEP and the Center for Research of Toxic Substances in the Environment, Faculty of natural sciences, University of Masarik in Brno, the Czech Republic (RECETOX) in 2016 the research based on air and soil samples collection and their laboratory analyses on POPs existence for monitoring of the environment in Kazakhstan has been conducted. As a result of researches regarding POP-pesticides has been established the following:

- the HCH highest level was detected on a meteorological station of Atyrau;

- DDT have been detected, as well as HCH in all places of sampling.

Monitoring of U-POPs

With financial support of the project "Initial Help to the Republic of Kazakhstan on Implementation of Obligations under the Stockholm Convention on POPs" in the Bashkir republican research ecological center the tests analysis of atmospheric air on the content of dioxine and furan has been implemented.

By results of researches the high content of PCDD/PCDF in the copper-smelting shop of mining and smelting plant in Balkhash city and near the agglomerative car at the "Mittalsteel Temirtau" plant is established, and atmospheric air of the sanitary protection zone of JSC "Ust-Kamenogorsk Titanium-magnesium plant" met standards concerning dioxin pollution .

Within the research conducted by RECETOX in 2016 regarding U-POPs has been revealed the following:

- the PCDD/F highest levels have been found in samples of meteorological station Kyzylorda;

- the highest levels of pollution from the dl PCBs were in Atyrau and Kyzylorda.

Monitoring of industrial POPs

As a result of RECETOX researches in 2016 regarding industrial POPs the following has been established:

- meteorological station Ust-Kamenogorsk was the most polluted area by PCB;

- air pollution by pentachlorobenzene was at all places of sampling identical, and levels of hexachlorobenzene were at one order higher.

Thus, today in Kazakhstan there is no complex system of POPs monitoring, including new POPs, in the environment and production. Respectively, not enough measures are taken for identification and POPs monitoring in the environment and final goods, and POPs impact on human health and environment as well.

1.3.9 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 droundsfor the exclusion of DDT. DDT is not produced in the Republic of Kazakhstan, is not imported and exported. DDTstocksofareburiedinthelandfillrepositories.

1.3.10Current 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.

Great impact of potential growth concerning safe handling of persistent organic pollutants was made by implementation of UNDP/GEF Project and Government of RK " National implementation plan update, integration of persistent organic pollutants control into the process of national planning and sustainable control of medical wastes in Kazakhstan". Within this project in 2014-2016 more than 20 seminars and trainings took place in which more than 1 000 people participated. Activities took place in Astana, Almaty, Ust-Kamenogorsk, Kostanay. Within held seminars and trainings POPs characteristic, including new POPs, issues of inventory and monitoring of POPs at the enterprises, and also regulations of POPs safe handling in different institutions were considered. Representatives of central and territorial authorized public authorities, industrial enterprises, enterprises for waste management, medical institutions, testing laboratories and centers, ecological non-governmental organizations, higher education institutions were trained.

Implementation of UNDP/GEF/Ministry of energyjoint project "Development and implementation of PCB management complex plan in Kazakhstan".

Within this project, about 20 seminars for various stakeholders have been held for period 2010-2014. In particular, training for implementation and knowledge of provisions and guides to PCB in public sector, including training of department of customs in PCB identification has been provided. Also within the project owners of PCB and service centers have been trained on equipment for PCB safe management. Seminars were in the West, North, East, South and Central Kazakhstan. Training was provided both in opened, and in a corporate format as well for separate industrial companies. In

total over 1000 people have been trained during implementation of project 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.

The Center "Assistance to sustainable development of the Republic of Kazakhstan", JSC "Zhasyl Damu" belongs to such organizations. For the last five years the Center "Assistance to sustainable development of the Republic of Kazakhstan" held more than 15 seminars and trainings for representatives of the industrial companies, public authorities and all stakeholders, issues of safe handling of persistent organic pollutants were considered as a part of seminars and trainings.

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

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.

1.3.11Activity of the non-governmental parties

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 activities and campaigns(distribution of booklets, flyers, skits on POPs);
- 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;
- movies, advertising videoclips, themes in the ecological programs;
- development and implementation of informational and educational programs at the national level.

Some projects of non-governmental organizations of the Republic of Kazakhstan including prepared together with the international organizations are given below (Table 20).

Table 20 – The reports on researches on POPs problems in Kazakhstan implemented by non-governmental organizations

№	NGO	Title of document
1	Arnika	«Toxic Pollutants in camel milk from the Mangystau Region of Kazakhstan», Prague – Aktau 2016
2	Arnika, Eco-museum	"Areas polluted by toxic substances" Prague – Karaganda 2015
3	Recetox	The review of the current situation on POPs monitoring in the environment in Kazakhstan and abroad, 2012 Ivan Holubek, Jan Klanov, Anton Kochan
4	Recetox	Structure of the offered network on monitoring of the persistent organic pollutants (POPs) in Kazakhstan, 2012 Ivan Holubek, Jan

		Klanov, Anton Kochan
5	Recetox	Review of the Current Situation in Laboratory Capacities for the Analysis of Polychlorinated Biphenyls in the Republic of Kazakhstan, Anton Kochan
6	Greenwomen Eco-forum Nauruzum Ecomuseum	Review of situation with POPs in Kazakhstan
7	Eco-accord	New persistent organic supertoxicants and their impact on human health, 2016 Amirov Z. K., Speranskaya O. A.
8	IPEN	Base for actions for human health protection and environment protection from dangerous pesticides, Jack Veynberg
9	IPEN	Pesticides: The threat is real. Moscow, 2004.
10	SNC - LAVALIN	Kazakhstan: the project on the offered localization and disposal of PCB and obsolete pesticides. Final report, 2011.

1.3.12ImpactofPOPsonhumanhealthandthe 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 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 liquid. Accordingtoarchivedata, 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.

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 1,720.4

*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, whichis 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.

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 results of epidemiological studies of Ablaketka and Balkhash provide proof of cancerigenicity and malignancy of persistent organic pollutants. The highest cancer 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 21).

Table21 – Intensive indicators of hormonal types of cancer (per 100 thousand female and male populations)

№ п/п	Территория	Tumors of female genital sphere	Breast cancer	Prostate cancer	Urinary bladder cancer	Thyroid carcinoma
1	Republic of	344,9	170,1	35,3	19,1	14,0

	Kazakhstan					
2	Plant of silk fabrics, Ust-Kamenogorsk	235,3	130,7	29,3	17,3	17,3
3	Ablaketka village	509,9	338,1	48,2	74,2	49,4
4	Balkhash city	431,5	205,7	31,8	33,6	30,9

Thus, implemented studying of case rate of oncologic pathology, the analysis of tumors of female genital sphere and hormonal dependent forms of cancer (breast cancer,prostate cancer, urinary bladder cancer and thyroid carcinoma), don't exclude impact of POPs on peoples body living in the explored districts.

2. ELEMENTS OF THE STRATEGY AND AN ACTION PLAN

2.1Implementation Strategy

By signing the Stockholm Convention, the Republic of Kazakhstan has committed itself to implement the provisions of the Convention.

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 (Ministry of Energy of the Republic of Kazakhstan). However, due to the large number of government agencies involved, it is necessary to establish a coordination mechanism, as required in accordance with the Stockholm Convention, and as it is practiced in other countries, including the CIS countries.

The NIP shall complete the current types of the national activity in the relevant spheres.The NIP shall be reviewed every 5 years. 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 Measures for improving the legislation of the Republic of Kazakhstan

Implementation of the obligations under the Stockholm Convention and implementation of the POPs inventory at the national level shall have a legal basis. In this regard, first of all, it is necessary to develop a draft law on amendments and additions to the Ecological codex of the RK, the Law "On safety of chemical products" and other legislative acts on issues of hazardous chemicals, including POPS. In particular, in the field of improvement of legislative base of Kazakhstan in the field of POPS it is necessary to introduce changes in the following areas:

1. the better management of the transportation, use, disposal, removal of pesticides, including POPS;
2. definition of privileges and preferences for enterprises temporarily storing PCB-containing equipment;
3. improvement of U-POPs regulation;
4. improvement of the Rules for handling persistent organic pollutants and wastes containing them;
5. restriction and prohibition of economic activities on territories, contaminated by POPS and others.

The draft law should provide for necessary changes not only in accordance with the Stockholm Convention, but also with other international agreements in the field of hazardous chemicals ratified by Kazakhstan.

Specific measures to improve legislation are presented in the Action Plan for the Implementation of the Obligations of the Republic of Kazakhstan under the Stockholm Convention on Persistent Organic Pollutants (Annex).

2.2.2 Measures for the disposal of pesticides containing POPs

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 conductthe most complete inventory, including laboratory research, and the creation of a full register of obsolete and unusable pesticides, including pesticides with POPs properties with indication of location, storage conditions, and volumes in other applicable information.

In order to reduce the negative impact of POPs pesticides on human health and the environment, it is necessary to take measures for the safe storage and disposal of pesticide wastes. Among such measures are the following:

1) carrying out a detailed inventory of obsolete pesticides;
2) construction of warehouses for temporary storage of pesticide wastes;

3) repackaging of obsolete pesticides;
4) collection and delivery of wastes to the site of elimination or temporary storage;
5) elimination of POPs pesticides wastes.

In addition, measures are required to clean up territories contaminated with pesticide wastes. First of all, in this direction it is necessary to carry out research works on the development of technology for the restoration of soils polluted with pesticide wastes, including pesticides with POP characteristics and direct work in the area of restoration of territories contaminated with pesticide waste.

Specific measures for the safe management of pesticides wastes containing POPs are presented in the Annex.

2.2.3 Measures for safe management, storage and destruction of equipment and waste containing PCBs

In Kazakhstan, a lot of work has been done in the area of handling PCB-containing equipment: amendments have been made to the legislation, inventory has been carried out, a large number of trainees have been trained in the methods of safe handling of PCB-containing equipment and wastes.

So far, in the field of management, storage and disposal of equipment and wastes containing PCBs, Kazakhstan should strengthen its work in the following areas:

1. Improving the inventory of PCB-containing equipment, improving the reporting of PCB-containing equipment to an authorized body in the field of environmental protection and improving monitoring of equipment and wastes containing PCBs at enterprises in order to continuously update information on PCB-containing equipment.
2. In order to improve the accuracy of the inventory of PCB-containing equipment and the full coverage of the territory of the Republic of Kazakhstan, an inventory requires an increase in the number of accredited laboratories equipped with measuring equipment, measurement techniques, state standard samples allowing to determine PCBs and entered in the state register.
3. To ensure widespread compliance with the requirements of the Environmental Codex of the Republic of Kazakhstan and the Rules for the Management of Persistent Organic Pollutants, strengthening of state control is required.
4. Organization of training courses for personnel of enterprises and regulatory bodies on the management of PCBs in order to enhance the capacity for the safe management of PCBs.
5. In order to ensure safety for human health and the environment, temporary storage facilities for PCB-containing equipment should be organized, as well as safe destruction of PCB-containing equipment and PCB-containing wastes.
6. In order to rehabilitate areas contaminated with PCBs and to reduce the negative impact of PCBs on human health and the environment, it is necessary to clean up contaminated areas.

Specific activities for the safe management, storage and destruction of equipment and wastes containing PCBs are provided in the Annex.

2.2.4 Measures to reduce emissions from unintentional production

In the field of reducing emissions of unintentionally formed POPs in the Republic of Kazakhstan in the near future, it is timely to amend the legislation of the Republic of Kazakhstan in the field of U-POPs, to improve the monitoring and control system for U-POPs, and to modernize existing and build new enterprises, taking into account the best available technologies and the best environmental practices.

In particular, it is necessary to work in the following areas:

1. The creation of chemical-analytical laboratory, focused on solving the challenges of the

Stockholm Convention on POPS, including the determination of U-POPS

Kazakhstan is currently lacking laboratory for determination of dioxins and furans.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.

2. 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.

3. Analysis of existing waste gas clean-up systems for enterprises and development of recommendations on the introduction of best available technologies and best environmental practices (BAT and BEP) to reduce dioxin and furan emissions and other U-POPs

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.

4. 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). Possibleandaffordable activitiesthat canbeperformedindividuallyorincombination,includethefollowing:

- reconstruction of existing technologies and the introduction of BAT & BEP**;**
- creation of enterprises on processing of medical waste with the BAT & BEP, as these processes lead to large emissions of U-POPs..

Specific measures to reduce U-POPsarepresentedintheAnnex.

2.2.5 Measures to reduce the environmental impact of new POPs

It is known that chemical substances, recognized in 2009 and 2011 as persistent organic substances, have neverbeen produced in the Republic of Kazakhstan. However, the proportion of imported products that could potentially contain new POPs, is high in Kazakhstan, coming from countries such as: USA, EU, India, China, the Russian Federation. Furthermore, during the Soviet Union products containing POPS freely sailed through to Kazakhstan.

According to the obligations under the Stockholm Convention at this stage, it is important for Kazakhstan to introduce amendments and additions to the legislative acts of the Republic of Kazakhstan on the regulation of new POPs, complete a detailed inventory and improve the monitoring system for new industrial POPs, and raise awareness of various stakeholders on new POPs.

Inparticular, thefollowingissues requireimmediateaction:

1. Completion of a detailed inventory of the sources of new industrial POPs (PBDE, PFOS):

Within the framework of the joint project of the Government of the Republic of Kazakhstan / UNDP / GEF "Upgrade of the National Implementation Plan, integration of persistent organic pollutants management in the national planning and rational management of medical waste in Kazakhstan", a preliminary inventory of PBDE and PFOS was conducted. However, further laboratory testing is required to clarify the presence of new POPs in products and materials and their quantity. In addition, it is necessary to develop monitoring of the content of new industrial POPs in samples of

products, wastes, storage sites (electronic and electrical equipment, furniture, etc.).

2. DevelopmentofmeasurestoreduceemissionsofnewPOPsintotheenvironment, includingtheintroductionofBATforwastecollectionandrecycling

Since the new POPS may be contained in many consumer goods, there should be measures to reduce emissions of new POPS in the processing of wastes that potentially contain POPs.

3. 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).

Given that the list of the Stockholm Convention is actively expanding, many involved in this issue do not have time to track these additions. Thus, there is a fairly low level of awareness of new POPs among government agencies, industrial enterprises, and waste processing enterprises. In this regard, the rise of the awareness of various stakeholders should be given a special priority.

Specific activities inthefieldofthe new POPs are presented in Annex.

2.2.6 Measures for the territories contaminated with POPs

In the field of cleaning the territories of the Republic of Kazakhstan contaminated with POPs and reducing their hazardous effects on human health and the environment, a thorough inventory in contaminated areas is needed, as well as the development of special preventive measures to prevent further pollution.

A thorough inventory in contaminated areas is needed to determine the exact area of the contaminated areas, pollutants and their quantity, and subsequent analysis of environmental hazards and assess the needs for cleaning.The development of special preventive measures is necessary to prevent further contamination with POPs due to leakage, evaporation or pollution of the environment as a result of natural disasters such as floods.

It is also necessary to conduct an analysis of possible ways of reclamation of contaminated areas and selection of a priority recultivation method, which may be the following:

- removal of the soil layer from the contaminated surface and packing it in sealed containers for subsequent transportation to the place of destruction;
- biological remediation of contaminated areas.

In addition, it is necessary to identify ways of destroying contaminated soil, including destruction at a hazardous waste destruction plant, the construction of which is planned in Kazakhstan.

Specific measures for the territories contaminated with POPs are presented in the Annex.

2.2.7 Measures to improve POPs monitoring

So far, for the Republic of Kazakhstan, it is urgent to introduce an actual monitoring system of POPs in the environment.

Monitoring of POPs is proposed to be introduced in two stages. At the first stage (2018-2023), in order to obtain a complete picture of POPs pollution of the environment, it is recommended to monitor surface water and soil in parallel with monitoring of atmospheric air. At the second stage (2024-2028) it is recommended to continue monitoring of atmospheric air, water and soil, and to include monitoring of POPs in human blood and breast milk.

Conducting air monitoring for the presence of POPs is recommended on the whole territory of Kazakhstan, surface waters and soil - on established contaminated zones, breast milk and human blood - everywhere.

It is recommended to conduct atmospheric air monitoring using both active and passive sampling methods. Passive air sampling for POPs has undergone significant technological

development over the past decade. Early studies used semi-transmissive membrane devices to measure POPs at a large spatial scale, now sampling installations are based on polyurethane foam discs and resins have been widely used.

The primary steps in the development of the POPs monitoring system should be directed at improving the regulatory framework.

It is also necessary to take measures to strengthen the technical capacity of territorial analytical laboratories to obtain reliable operational data on pollution of surface and groundwater, soil and ambient air by POPs. In addition, studies should be undertaken to assess the contamination of soils and groundwater, especially in places where obsolete and forbidden pesticides are buried, in waste dumps and other "hot spots" of pollution.

2.2.8 Measures forarranging information exchange and stakeholder involvement

To improve information exchange and stakeholder involvement in solving problems related to POPs, in Kazakhstan it is necessary to establish a coordination mechanism for POPS issues, and to take measures to improve statistical reporting in the field of hazardous chemicals.

1. Creationofthe coordination mechanism for POPs issues

Currently, in many cases, the functions, responsibilities and competencies of various ministries and departments in the field of chemical safety are duplicated, and there is weak coordination of activities in various fields. There is a lack of an integrated system, including cross-cutting issues, for the effective management of waste and chemicals, including POPs, due to the limited interaction between public authorities, service providers and stakeholders.

In order to fulfill the obligations under the Stockholm Convention, it is necessary to establish a coordination mechanism between individual agencies working in the field of management of hazardous chemicals and wastes containing POPs.

The National coordination center of the Republic of Kazakhstan on persistent organic pollutants (NCC POPs), whose function is the interaction of ministries, departments and all stakeholders on POPs issues and the implementation of NIPs, has been proposed as a link in the coordination mechanism. The functions of the NCC of POPs are supposed to be entrusted by the Ministry of Energy of the Republic of Kazakhstan to the subordinate organization of JSC "ZhasylDamu".

Activities of NCC POPs RK should include the development of a system of measures ensuring the implementation of the Stockholm Convention consideration of issues of technical, financial and personnel support for implementation of the Stockholm Convention, making proposals to the heads of state bodies on improvement of normative legal acts and the conduct of research in the field of persistent organic pollutants, participation in the development of projects concepts and normative legal acts in the field of persistent organic pollutants, the creation of working groups on improvement of legislation and development of policy documents, preparation of information materials and public awareness about the POPs problem, the analysis of the results of completed research works on the issue of POPs and the preparation of proposals for their implementation and other functions within the tasks.

The task of the NCC POPs is to monitor and evaluate the implementation of the NIP and make decisions on its revision and updating. Another important task will be to introduce elements of NIP implementation into other national strategies, policy decisions and plans. The NCC POP should coordinate the implementation of Kazakhstan's international obligations under the Stockholm Convention, the Rotterdam Convention, the Basel Convention, the Aarhus Protocol on Pollutant Release and Transfer Registers, ensuring cooperation, improving efficiency, transparency, improving reporting and mutual development.

For the functioning of the coordination mechanism, it is necessary to legislatively allocate the functions and competencies of government agencies in the field of hazardous chemicals

management, POPs, as well as the implementation of activities envisaged by the NIP. In this regard, it is necessary to introduce changes and additions to the current powers of state bodies (regulations), as well as additions to the strategic plans of ministries and departments on the implementation of measures planned under the NIP.

2. Improved reporting on hazardous chemicals, including POPs

Fortimelydecision-makingonproblemsrelatedtoPOPs, itisnecessarytoestablishstatisticalreportingandprimaryaccountingofdataonthelifecycleofhazardouschemicalsinKazakhstan, includingPOPs. In addition, a mechanism should be developed to provide information from industry and professional users on the reduction or elimination of POPs sources, POPs emissions, including U-POPs and other aspects related to POPs.

Specific measures in the field of facilitation and exchange of information are presented in the Annex.

2.2.9 Measures to increase public awareness and training

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

In order to improve the system for the safe management of POPs, as well as for the implementation of a coordinated policy of government agencies in the field of the safe treatment of POPs, measures should be taken to increase the awareness of decision-makers, industry and the public about POPs environmental and health impacts, importance of legitimateregulation of chemicals at all stages of their life cycle.

It seems appropriate to implement the following measures aimed at raising public awareness, information and training. In particular, the following measuresare to be implemented:

- 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;

Public awareness 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.

The priority areas for achieving NIP, in which training is needed, are:

1. Creation of a regulatory and legal framework for the implementation of the obligations of RK under the Stockholm Convention.
2. Establishing the responsibility of authorized state bodies in the field of POPs;
3. Inclusion of the POPs inventory in the national statistical reporting system and the state environmental monitoring system in order to improve the monitoring system.
4. Development of a targeted long-term program for the elimination of POPs and reduction of emissions of unintentional POP sources.
5. Implementation of POPs destruction projects; rehabilitation of territories contaminated by them, and reduction of unintentional releases of POPs.
6. Organization of a chemical analytical laboratory focused on the tasks of the Stockholm Convention on POPs, including the determination of dioxins and furans.

Specific measures for raising public awareness and training on POPs are presented in the Annex.

2.3 Evaluation of effectiveness

Performance evaluation is an important component of the NIP. It allowsto see at which stage of the implementation of the measures the goals are achieved, and also to understand what components of the NIP need to be updated. The assessment should be conducted in a manner that ensures transparency of the process and the involvement of all partners.

Responsible body for performance evaluation is NCC POP. Ministries and other involved government agencies are responsible for monitoring and evaluating the activities of their subordinate sectors. The evaluation reports are periodically submitted to the authorized body in the field of environmental protection.

The NIP includes a set of evaluation criteria (indicators) that are associated with measures and planned activities under the NIP. Verifiable indicators of NIP may include the following indicators (but not necessarily limited to them):

- introduction of amendments and additions to the national legislation of the Republic of Kazakhstan regarding the regulation of POPs;
- availability of a coordination mechanism and a permanent secretariat (NCC POPs)
- number of seminars, trainings, roundtables on POPs issues;
- availability of a register of pesticide residues with POPs characteristics;
- number of warehouses for temporary storage of POPs pesticide waste;
- share of waste pesticides repackaged in a safe container, to the total volume of pesticide wastes;
- presence of a register of PCB-containing equipment;
- register of dioxin and furan emissions with up-to-date emission data;
- presence of a plant for the destruction of hazardous waste, including POPs;
- share of territories rehabilitated after contamination with POPs, to the total area of contaminated sites.

The results of the effectiveness evaluation are used to update the NIP and the chemical safety policy. Evaluation reports should be available to the general public. In particular, by publishing on the site of the NCC POPs and the authorized body in the field of environmental protection.

Reducing the level of POPs in the components of the environment and foodstuffs will indicate the successful implementation of the action plans proposed in the NIP. If the effectiveness assessment indicates that the risk of POPs has not decreased sufficiently, further measures can be taken.

The results of the NIP's implementationeffectiveness will be presented in the reports on the effectiveness of the implementation of obligations under the Stockholm Convention on POPs provided to the secretariat of the Stockholm Convention.

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 22.

Table 22– 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)
2015			COP -7

2017	Evaluation of the mid-term plan	The mid-term plan (Progress is evaluated against the objectives set by the NIPaction plans. Particular attention is drawn to the dioxins and furans).	COP -8
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

2.4 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 23.

Table 23 - Mandatory requirements for reports and their frequency in accordance with the provisions of the Convention

The main requirements of the Stockholm Convention	Requirement 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	Kazakhstan provides the NIP within two years after the date of the entry into force of the Convention; reviews and

	updates the NIP; where appropriate cooperates directly or through global, regional and subregional organizations, and consultsits 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.	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: 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.	In accordance with the procedure specified by decision of the First Conference of the Parties
AnnexA, PartII, 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 24 shows a schedule for provision ofsummary reports by the Republic of Kazakhstan after the ratification of the Convention in accordance with the requirements of the Stockholm Convention.

Table 24 – Schedule for provision of summary report by the Republic of Kazakhstan in accordance with the requirements of the Stockholm Convention

№	Activity	Conference of	Year

п/п		theParties	
1	Entry into force of the Stockholm Convention on POPs for the Republic of Kazakhstan. Approval of the NIP.		**2010**
2	INationalreport. Review ofstrategies to reduce unintentional releases of POPs	**COP-5**	**2011**
3	Implementation effectiveness evaluation	**COP-6**	**2013**
4	Report on progress in eliminating the use of PCBs		**2014**
5	IINationalreport. Review of strategies to reduce unintentional releases of POPs	**COP-7**	**2015**
6	Implementation effectiveness evaluation	**COP-8**	**2017**
7	Report on progress in eliminating the use of PCBs	**COP-9**	**2019**
8	III National report. Review of strategies to reduce unintentional releases of POPs		**2020**
9	Report on progress in eliminating the use of PCBs	**COP-11**	**2023**
10	III National report. Review of strategies to reduce unintentional releases of POPs		**2024**
11	Implementation effectiveness evaluation	**COP-12**	**2025**

2.5 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. 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 NCC POP 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 the NCC POP 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;
- 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".

The Government of Kazakhstan requires an international financial support 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.

Annex

Plan of measures to implement the commitments of the Republic of Kazakhstan under the Stockholm Convention on Persistent Organic Pollutants

№	Activity	Deadline	Responsible body	Indicator
1. Measures to improve legislation in the field of POPs				
1.1	Development of the concept of the draft law on introducing changes and amendments to some legislative acts of the Republic of Kazakhstan on hazardous chemicals, including persistent organic pollutants	2017-2018	The authorized body in the field of environmental protection, industrial safety, agriculture, health, NGOs	Approved Concept of the Draft Law
1.2	Development of the draft law on amendments and additions to certain legislative acts of the Republic of Kazakhstan on hazardous chemicals, including persistent organic pollutants	2018-2021	The authorized body in the field of environmental protection, industrial safety, agriculture, health, NGOs.	Approved Law
1.3	Amendments and additions to existing powers of state bodies under the POPs coordination mechanism	2017-2018	The authorized body in the field of environmental protection, industrial safety, agriculture, health, civil protection, sanitary and epidemiological welfare of the population, statistics, archives, education and science, foreign affairs, customs, housing and communal services	Amendments and additions to the provisions of relevant ministries and agencies
1.4	Changes and additions in strategic plans of ministries and agencies on implementation of activities planned under the NIP	2017-2018	The authorized body in the field of environmental protection, industrial safety, agriculture, health, civil protection, sanitary and epidemiological welfare of the population, statistics, archives, education and science, foreign affairs, customs, housing and communal services	Amendments and additions to the provisions of relevant ministries and agencies
2. Measures for waste pesticides containing POPs, including new POPs				
2.1	Inventory (survey of warehouses, burial grounds, aerodromes of agricultural aviation and other places of possible contamination with obsolete pesticides,	2017-2018	The authorized body in the field of environmental protection and its territorial units, the authorized body in the field of	Documented inventory reports, including a summary table of

	including POPs, on 80% of the territory not covered by the preliminary inventory)		agriculture and its territorial units, the authorized body in the field of health, local executive bodies, technical assistance	locations of obsolete pesticides (including POPs) by regions
2.2	Creation of a full list of pesticide wastes	2018	Subordinate organization of the authorized body in the field of environmental protection	A list of pesticide residues, including POPs pesticides
2.3	Identification of samples taken during the inventory	2019	The authorized body in the field of environmental protection and its territorial units, the authorized body in the field of agriculture and its territorial units, the authorized body in the field of health, local executive bodies, technical assistance	Acts of acceptance of work performed
2.4	Repackaging of pesticides wastes	2017-2018	The authorized body in the field of environmental protection, agriculture, technical assistance	Repacked wastes of pesticides
2.5	Construction of warehouses for temporary storage of pesticides	2018-2019	Authorized body in the field of environmental protection, industrial safety, technical assistance	Warehouses for temporary storage of pesticides
2.6	Collection and delivery to the place of destruction	2018-2020	The authorized body in the field of environmental protection, agriculture, technical assistance	Acts of acceptance and transfer of pesticide wastes in places where pesticide wastes are destroyed
2.7	Destruction of pesticide wastes	2020-2025	The authorized body in the field of environmental protection, agriculture, specialized enterprises for waste management	Acts of destruction of pesticide wastes
2.8	Research works on the development of technology for the restoration of soils polluted with pesticide wastes, including pesticides with POP properties, as well as the impact of POPs pesticides on the health of people living in or near contaminated areas	2017-2020	The authorized body in the field of environmental protection, education and science, public health, sanitary and epidemiological welfare of the population, scientific research institute, NGO	Reports on scientific research works
2.9	Restoration of soils polluted with pesticide wastes	2020-2025	Authorized body in the field of environmental protection, agriculture, farm and agricultural associations, technical assistance	Acts of acceptance of work performed

3. Measures for the destruction of PCBs-containing equipment and wastes				
3.1	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	ежегодно с 2017по 2028	The authorized body in the field of environmental protection, energy, industrial safety, defense, subordinate organization of the authorized body in the field of environmental protection, industrial enterprises	A complete register of PCB-containing equipment
3.2	Organization of training courses for personnel of enterprises and supervisory bodies for managing PCBs	2017-2025	Service consulting companies	Periodictrainingcourses
3.3	Organization of temporary storage facilities in industrial enterprises and specialized enterprises for waste management	2017-2018	Owners of equipment, industrial enterprises, specialized enterprises for waste management	Ecological conclusion on storage sites in authorized state bodies
3.4	Construction of the plant for destruction of equipment and hazardous wastes, including PCBs.	2018-2020	Authorized body in the field of environmental protection, general contractor	Acts of acceptance of works performed
3.5	Preparation and transportation of PCB-containing equipment for destruction	2018-2019	The owners of the equipment	Acts of acceptance for storage
3.6	Destruction of PCB-containing equipment and waste	2020-2025	The owners of POPS wastes, plant for the destruction of POPS, a subordinate organization of authorized body in the field of environmental protection	Acts of acceptance of works performed
3.7	Rehabilitation of contaminated sites	2020-2025	The authorized body in the field of environmental protection, subordinate organization of the authorized body in the field of environmental protection, contractors, MIOs, technical assistance	Acts of acceptance of works performed
4. Measures to reduce emissions of dioxins and furans and other unintentionally generated POPs				
4.1	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	2017	The authorized body in the field of environmental protection, the subordinate organization of the authorized body in the field of environmental protection, industrial enterprises	Documented inventory reports
4.2	Creationofachemicalanalyticallaboratoryforthedetermination ofdioxinsandfuransandother U-POPs	2017-2018	The authorized body in the field of environmental protection, sanitary and epidemiological welfare of the population,	Operating laboratory

			technical assistance	
4.3	Organization of training courses of personnel of the enterprises and supervisory organizations on PCB management	2018-2028	The authorized body in the field of environmental protection, the subordinate organization of the authorized body in the field of environmental protection, the chemical analytical laboratory, industrial enterprises	Register of dioxin and furan releases with up-to-date emission data
4.4	Analysisoftheexistingfluegastreatmentsystemsofth eenterprisesanddevelopmentrecommendationsforth eimplementationofbestavailabletechniquesandbest environmentalpractices (BAT&BEP) toreducereleasesofdioxinsandfuransandotheruninte ntionallyproducedPOPs	2018 –2020	The authorized body in the field of environmental protection, industry associations, industrial enterprises	Analytical report
4.5	Improvement of existing technologies and implementation of BAT and BEP	2020-2028	The authorized body in the field of environmental protection, industry associations, industrial enterprises	Modernization of industrial enterprises
4.6	Creation of enterprises on processing of medical waste with the BAT & BEP	2017-2028	Authorized body in the field of environmental protection, health, industrial safety, private business for waste management	Operating waste processing enterprises
5. Measures to reduce the impact of new industrial POPs				
5.1	Conduction of aninitialassessmentoftheuseofnewPOPs: collection ofinformationonthe important useofPBDE, OBDEand PFOSfromkeystakeholders	2017-2019	The authorized body in the field of environmental protection, industrial safety, customs, "Atameken", industrial associations, technical assistance	Documented reports on the conduct of the initial assessment
5.2	Conduction of a detailed inventory of the sources of new industrial POPs (PBDE, OBDE PFOS): the use, the life cycle and potential emissions.	2017-2020	The authorized body in the field of environmental protection, industrial safety, customs, "Atameken", industrial associations, technical assistance	Documented inventory reports
5.3	Determination of the content of new industrial POPs in samples of products, wastes, storage areas (electronic and electrical equipment, furniture, etc.)	2017	The authorized body in the field of environmental protection, industrial safety, testing laboratories, technical assistance	Test certificates
5.4	DevelopmentofmeasurestoreduceemissionsofnewP OPsintotheenvironment, includingtheintroductionofBATforwastecollection andrecycling	2018	The authorized body in the field of environmental protection, industrial safety, industry associations, NGOs	Action plan to reduce emissions of new POPs

5.5	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)	2017-2018	Authorized body in the field of environmental protection, IOE, industry associations, industrial enterprises, NGOs	Conducting seminars, round tables
6. Measures for POPs contaminated areas				
6.1	Conducting a thorough inventory in the contaminated areas, followed by an analysis of environmental hazards and assessment of needs for treatment, preparation of an economic justification for the implementation of this activity	2019-2021	The authorized body in the field of environmental protection, sanitary and epidemiological welfare of the population, health, subordinate organization of the authorized body in the field of environmental protection, technical assistance	Documented inventory reports
6.2	Development of special preventive measures to prevent further pollution due to leakage, evaporation or pollution caused by natural disasters, such as floods	2022	The authorized body in the field of environmental protection, sanitary and epidemiological welfare of the population, civil protection, industrial safety, water management, NGOs	Action plan to prevent further pollution of territories with persistent organic pollutants
6.3	Determination of ways of reclamation of contaminated areas, determination of priority recultivation method, including its feasibility study	2022-2023	The authorized body in the field of environmental protection, the subordinate organization of the authorized body in the field of environmental protection	Report on analysis, feasibility study
6.4	Determination of ways of destroying contaminated soil and determining the priority method of destruction, including its feasibility study	2022-2023	The authorized body in the field of environmental protection, the subordinate organization of the authorized body in the field of environmental protection	Report on analysis, feasibility study
7. Measures in the field of improving the monitoring of POPs				
7.1	Strengthening the technical capacity of territorial analytical laboratories to obtain reliable operational data on pollution of surface and groundwater, soil and air	2017-2020	The authorized body in the field of environmental protection, sanitary and epidemiological welfare of the population, education and science, health, subordinate organization of the authorized body in the field of environmental protection, testing laboratories	Conducting seminars and trainings, round tables, purchasing equipment for analysis, introducing equipment and techniques into the state register
7.2	Introduction of a special type of state monitoring -	2018-2020	The authorized body in the field of	Data on POP monitoring

	monitoring of POPs, including monitoring of the environment (water, air, soil, as well as sanitary and epidemiological monitoring of POPs accumulation in the human body (blood and breast milk)		environmental protection, public health, sanitary and epidemiological welfare of the population, the RSE "Kazhydromet", testing laboratories	are included in the National Environmental Report and in the bulletins of the RSE"Kazhydromet"
7.3	Conducting scientific research on the assessment of soil and groundwater contamination, especially in places where obsolete and banned pesticides are buried, in waste dumps and other "hot spots" of pollution	2017-2020	The authorized body in the field of environmental protection, education and science, sanitary and epidemiological welfare of the population, subordinate organization of the authorized body in the field of environmental protection, testing laboratories, SRIs, NGOs	Reports on scientific research works
8. Measures in the field of facilitation and exchange of information and involvement of stakeholders				
8.1	Establishment of a coordination mechanism on POPS	2017-2018	The authorized body in the field of environmental protection, industrial safety, agriculture, health, civil protection, sanitary and epidemiological welfare of the population, statistics, archives, education and science, foreign affairs, customs, housing and communal services, the NCC POPS, technical assistance	A permanent mechanism for interaction between government agencies on POPs issues, based on the coordination point for the three conventions
8.2	Development of a mechanism for providing information from industrial and professional users (reduction or elimination of POP sources, POPs emissions, including U-POPs)	2017-2028	The authorized body in the field of environmental protection, statistics, industry associations, NGOs, NCC POPs	Amendments to the normative acts on the provision of information
8.3	Improvement of statistical reporting and accounting of chemicals at the state level	2017-2018	The authorized body in the field of environmental protection, industrial safety, statistics, technical assistance	Introduction of changes and additions to the legislation of the Republic of Kazakhstan on statistics
9. Measures in the field of public awareness and training				
9.1	Conducting seminars and trainings for various target groups (government bodies, industrial enterprises, non-governmental organizations,	2017-2028	The authorized body in the field of environmental protection, education and science, archives, subordinate organization of	Carrying out of training seminars, round tables

	universities, population, etc.) regarding the safe management of POPs		the authorized body in the field of environmental protection, NGOs, technical assistance	
9.2	Development of information materials, online courses aimed at raising public awareness on the impact of POPs and measures for the safe management of POPs	2017-2020	Authorized body in the field of environmental protection, NGOs, technical assistance	Availability of information materials, reports on distribution of materials
9.3	Development and implementation of a training program in the field of safe management of POPs for universities, colleges, advanced training courses	2017-2018	Authorized body in the field of environmental protection, education and science, NGOs, technical assistance	Presence of a training program, a report on its implementation in higher education institutions, colleges and advanced training courses