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המגזין המדעי הפופולרי ביותר בישראל
מגוון תוכן מדעי וטבעי
מאת: ד"ר יעקב שניידר
עורך: ד"ר יעקב שניידר
תאריך: 2010



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REPUBLIC OF KAZAKHSTAN: Environmental Pollution Status Report

Adopted by the presidential decree of 3 December 2003 Kazakhstan's National Ecological Security Concept articulates series of primary ecological security objectives, including ecological disaster areas, testing and military-space ranges rehabilitation; atmospheric pollution liquidation and prevention; radioactive, bacteriological and chemical pollution liquidation (including cross-border pollution); ensuring a decrease in the amounts of accumulated industrial and household wastes etc.

The objectives mentioned above will be achieved by the following means:

- improvement and systematization of relevant legislative acts adopted in the Republic of Kazakhstan
- economically sound natural resources utilization mechanisms;
- state ecological control and monitoring;
- optimization of the natural resources utilization sanctioning system and ecological expert assessment;
- research and development projects in the environmental protection sphere;
- ecological education and public participation;
- expanded international cooperation.

The Concept envisions implementation of the following programs:

- greenhouse gases reduction in the Republic of Kazakhstan by the year 2015;
- historically accumulated pollution liquidation;
- improved industrial and household waste management;
- ecological monitoring of testing, military and space ranges' territories, etc.

The special working group on environmental protection action plans implementation convened by European Economic Cooperation Organization member states conducted its meeting in October 2003. Ms. Aitkul Samakova, Kazakhstan' Environmental Protection Minister was elected to serves as the group's chairperson.

At the special working group session a proposal was articulated to define Kazakhstan as a model state to initiate environmental protection system reforms and environmental legislation harmonization with the relevant European Union legislative acts.



«We shall design the new ecological legislation idea and structure keeping the European Union in mind as our most important external trade and investment partner»,
- believes Kazakhstan's Environmental Protection Minister.

Legislation

In Kazakhstan the Laws “On environmental protection”, “On subsurface resources and subsurface resources use”, “On nuclear energy use” (the latter one regulates radioactive wastes issues) represent the cornerstone pieces of legislation regulating industrial and consumer wastes issues.

In February 2003 Kazakhstan ratified Basle Convention on control over cross-border dangerous wastes shipment and liquidation.

The country implements environmental quality norms. For example, these norms include the following key parameters: absolute limits of harmful substances concentration in the environment; absolute limits of acceptable environmental pollutants emissions, absolute limits of acceptable radioactive influence; absolute limits of poisonous chemicals application in agriculture and forestry etc.

Environmental Protection Ministry has started to reform the country's environmental protection legislation – the essence is to systematize various legislative norms and standards and improve their overall effectiveness. Development of the draft Environmental Protection Code or the, so called, Ecological Code will attempt to achieve this objective. The Code will cover Industrial and household wastes issues as one of its most prominent focus areas.

Environmental Protection Ministry has developed and the Government has reviewed a bill “On mandatory ecological insurance”. It covers enterprises working in ecologically dangerous industry sectors and stipulates that funds accumulated in insurance entities will guarantee compensation for damage caused to the environment even in cases of major accidents and catastrophes.

In addition, Environmental Protection Ministry is planning to develop a bill “On ecological audit”, an important measure required to implement mandatory ecological insurance requirements.

Environmental Protection Ministry has developed a bill providing for legislative additions and modifications on issues related to industrial and household wastes. Additions and modifications envision changes in wastes treatment, placement, cross-border transportation and define functions of government entities dealing with wastes.

Environmental Protection Ministry in cooperation with other interested government entities will develop series of legislative acts defining wastes treatment, dangerous impacts classification, placement limits, wastes pasportization etc.

Improvements of legislative norms related to industrial and household wastes are designed to:

- introduce in Kazakhstan internationally accepted government policy principles in the sphere of industrial and household wastes;

- Improve coherence of government entities functions in the wastes treatment sphere, uniform accounting organization and implementation (based on modern classifications adhering to international standards), the statewide wastes registry development;

- maximum recycled wastes application in production processes as additional sources of raw materials etc.

In November 2003 Parliament of Kazakhstan conducted its hearings on the topic of "Industrial and household wastes: issues and solutions". The following recommendations resulted from the hearings.

The Parliament's Majilis Committee on Ecology and Natural Resources Use recommended:

To the Government of Kazakhstan

- introduce into the Parliament of Kazakhstan a bill "On industrial and household wastes";

- ensure registry updates covering mineral accumulations resulting from technological processes and other wastes;

- develop and approve the new wastes classification (accounting for internationally accepted procedures);

- develop preconditions ensuring adoption of ecologically clean and zero-waste technologies preventing environmental pollution;

- support non-governmental organizations conducting demonstration projects, educational series and working with the general public to promote clean production methodologies and pollution prevention;

- develop improved methodologies to determine payment rates for wastes placement;

- provide for a stable tax regime for resource users including payment rates for wastes placement;

- research and introduce into the Parliament of Kazakhstan appropriate proposals aimed at improving payments accumulation mechanisms and deposits in a special fund;

- assess opportunities for targeted wastes placement funds application to address ecological issues of enterprises depositing these payments;

- provide for annual state budget funding (co-funding) for historical pollution liquidation projects (during the first stage review Ilek river cross-border chromium pollution liquidation project and Stepnogorsk city low radiation wastes tail storage re-cultivation project);

- assess funding possibilities to construct inter-regional radioactive wastes burial points in the country's western and central regions;

- develop a tax breaks feasibility assessment for enterprises investing funds in production processes using technological wastes as raw materials.

Series of recommendations were issued to ministries and government agencies dealing with wastes-related issues.

Kazakhstan's Ecological Security Concept identifies nationwide ecological issues. Primary ones include:

1. Historical pollution (historical pollution sources consist of accumulated previous production activities in the oil and gas sector, power generation, mining and processing industries, as well as, abandoned wells and mines (including the ones containing radioactive wastes), tail storage facilities and drainage collectors posing clear and present dangers to the country's ecological security).

In early 2003 Kazakhstan joined the Basle Convention on control over cross-border dangerous wastes transportation and liquidation, which allowed to institute new customs regulations on declaring dangerous wastes and to prevent future shipments disguised as raw materials and finished products.

Currently Kazakhstan is implementing a Uranium Industry Radioactive Wastes Liquidation Program and Abandoned Oil Wells and Self-emitting Hydro Geological Wells Liquidation Program. However, these programs do not cover all historic pollution types. That is why there is a need to develop a special historical pollution liquidation program. Until 2006 this program should provide for a multi-stage development of all historical pollution sites registry and their environmental impact assessment. Identified sites liquidation should begin in 2010.

2. Cross-border issues (cross-border ecological issues include, for example, cross-border water pollution, atmospheric air and soils pollution, dangerous technologies, substances and wastes shipments, development of raw materials deposits in border regions, unique natural complexes preservation etc.).

Kazakhstan joined the Helsinki Convention on Cross-border Water Currents and International Lakes Use, allowing to develop uniform legal approaches to addressing rational utilization and cross-border rivers preservation issues.

However, other Central Asian states did not join the Convention and did not take measures to prevent possible cross-border impacts of dangerous substances leakage and the “polluter pays” principle enforcement.

The Convention stipulates that cross-border ecological threats prevention and liquidation requires, among other measures, to:

- conduct joint ecological assessment research in border regions of Kazakhstan and neighboring countries in 2005-2007;

- resolve cross-border water issues by advancing Kazakhstan’s initiatives on supporting Central Asian states accession to the Helsinki Convention.

3. Military, space and testing ranges impacts

Currently there are four military testing ranges operating in Kazakhstan, as well as “Baikonur” space center.

Real ecological threats include falling rocket particles, highly toxic fuel spills and other factors negatively impacting the environment and people living in close proximity.

Currently scientific research projects are being carried out in the framework of the state budget financed Program on ecological conditions monitoring in parts of the Republic of Kazakhstan’s territory impacted by rocket and space activities. “Kapustin Yar” military testing range assessment program is also underway.

Decreasing adverse impacts of rocket and space activities on the environment and people’s health, ensuring rocket and space complexes ecological security are gaining importance. To address these needs, it is proposed that in 2005 a special industry program on the ranges’ ecological conditions monitoring will be developed.

Also, in the framework of the 2003-2010 mineral raw materials complex resource base development program, complex hydro geological and geoecological studies have been initiated at military testing ranges.

Kazakhstan's Ecological Security Concept defines series of local ecological issues.

Local ecological issues include:

1. Air pollution.

Non-ferrous metallurgy, power generation, ferrous metallurgy, oil and gas complex and various transportation means are major contributors to atmospheric pollution.



Atmospheric pollution issues are particularly relevant in large cities and industrial regions inhabited by more than a half of the country's population.

High pollution levels have been detected in 10 cities, 8 of them have high air pollution levels. Ust-Kamenogorsk, Ridder, Almaty, Shymkent, Aktobe, Temirtau continue to be among the most highly polluted cities. "Balkhashzvetmet" industrial conglomerate, copper-chemical combine of "Vostokkazmet" branch and "Kazakhmys" corporation have the worst environmental pollution records.

Key factors contributing to high air pollution levels in cities include outdated production technologies, ineffective pollution control facilities, low quality fuels, low levels of renewable and non-traditional energy sources. Major proportions of industrial centers' population live in harmful emissions high impact zones since more than 20% of all industrial enterprises do not have sanitary protection zones.



Rapid increase in the number of motor vehicles results in greater concentrations of carbon oxide and nitrogen dioxide in large cities (Almaty, Ust-Kamenogorsk, Shymkent), where annual average concentrations exceed maximum acceptable limits.

Development of hydrocarbon resources deposits, also, contributes to atmospheric pollution with increased concentrations of hydrogen sulphide. Burning accompanying gases on flares leads to major atmospheric emissions of greenhouses gases, sulfur and nitrogen oxides, develops high heat environment around wells.

In her presentation at the parliamentary hearings on environmental protection issues in Kazakhstan, Ms. Aitkul Samakova, Environmental Protection Minister announced numbers of law suites filed in 2003 on environmental protection legislation-

related charges. In total 266 suits were filed in connection with atmospheric air and radiation pollution, 166 – water resources pollution, 60 – soils pollution, 177 – improper wastes placement and recycling.

2. Radioactive pollution

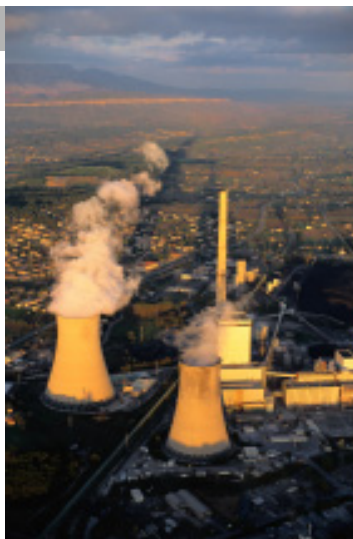
Radioactive pollution presents a real threat to Kazakhstan's ecological security and can be classified into four major groups:

- *abandoned uranium extraction and processing facilities (uranium mines wastes, self-emitting wells, tail storage facilities, decommissioned technological production processes equipment);*

- *territories polluted as a result of nuclear weapons testing;*

- *oil industry and oil equipment wastes;*

- *wastes accumulated as a result of nuclear reactors operations and radioisotope finished products (used ionizing radiation sources).*



In Kazakhstan there are six major uranium-bearing geological provinces, scattered small deposits and uranium concentrations, wastes accumulated at uranium extraction facilities and nuclear explosions sites, which determine elevated natural radioactivity levels.

On 30% of Kazakhstan's territory there is potential for excess emissions of the natural radioactive gas – radon posing real threats to people's health. It is dangerous to drink or use for other purposes water containing radio nuclides..

Kazakhstan's industrial enterprises contain more than 50 thousand used ionizing radiation sources and radiation survey revealed and allowed to liquidate more than 700 uncontrolled sources, 16 of which were life threatening.

To counter radioactive environmental pollution threats it is important to:

- *complete development of the radioactive pollution sources and develop by 2005 a program providing for*



natural radioactive emissions adverse impacts study, as well as restrictive measures determining construction sites selection and natural construction materials application;

- ensure control over radioactive natural potable water sources pollution, liquidate hydro geological wells containing high radio nuclides levels (in the framework of the approved Program on oil and self-emitting hydro geological wells conservation and liquidation);

- develop measures ensuring timely distribution of information about heightened radioactive emissions;

- complete by 2005 all activities aimed at developing a registry and environmental impact assessment of uranium extraction industry wastes (in the framework of the Program on radioactive uranium industry wastes liquidation).

A complex problem solution should include establishment of a specialized entity monitoring radioactive wastes recycling and burial.

In country radioactive wastes storage facilities have been filled almost to capacity. It is important to recycle, condition and place radioactive wastes from these facilities into long-term storage. To achieve this objective, it is necessary to construct a special processing and a long-term storage facility.

3. Bacteriological and chemical pollution

3.1. Bacteriological pollution.

Biological testing range operations on the Aral Sea Vozrozhdenie island present a potential bacteriological contamination threat.

Considering that some biological agents can survive for extensive periods of time in external environment objects and animal organs there is a real threat of these agents spreading on the territory of Kazakhstan and neighboring states. It is impossible to rule out potential presence of natural highly dangerous infections zones on Vozrozhdenie island.



To prevent bacteriological pollution threat from turning into reality it is important to conduct on-going epidemiological fauna and environmental objects monitoring on the territory of Vozrozhdenie island.

Throughout the Republic sanitary epidemiological service and state anti-plague agencies carry out highly dangerous infectious strings monitoring on a quarterly basis. Kazakh scientific center for quarantine and infections collects all identified strings from all regions, serving as the depository of highly dangerous infectious strings ensuring

proper registration, management and protection of the deposits.

Currently Kazakhstan implements a joint US-Kazakhstani program on “Development of the active epidemiological monitoring integrated system in the Republic of Kazakhstan” aimed at protecting population from highly dangerous infectious sources and fostering the country’s biological security.

3.2. Chemical pollution.

In Kazakhstan among all chemical substances we should specifically highlight persistent organic pollutants (POPs) posing particularly acute threats.

Persistent organic pollutants (POPs) constitute a diverse group of chemical substances. POPs are highly toxic and can adversely impact wild nature and people’s health even at low concentration levels. Chemical mixtures representing the group can be carried in the air and water, by migrating animals. They can accumulate far away from the emission source damaging continental and marine ecological systems.



In May 2001 Government of Kazakhstan signed the Stockholm Convention on persistent organic pollutants.

Pesticides constitute a major proportion of POPs in Kazakhstan. Power generation, petroleum processing and chemical industries serve as sources and consumers of POPs.

Considering their adverse environmental impact and possible irreversible genetic processes, it is of utmost importance to develop a POPs control, monitoring and management program in 2005-2006.

POPS IN KAZAKHSTAN

In May 2001 Government of Kazakhstan signed the Stockholm Convention on persistent organic pollutants (POPs).

On 17 May 2004 the Convention took effect after ratification in 50 countries.

Currently among CIS countries Georgia, Kazakhstan (May 2001), Kyrgyzstan, Moldova, Russia, Tadjikistan, Ukraine are signatories to the Convention. Armenia and Azerbaijan have ratified the document.

In early 2004 Kazakhstan completed a preliminary assessment of outdated and unusable pesticides – chemical substances applied to protect plants from harmful insects and other adverse circumstances.

The action took place in the framework of a UNDP/NEF project entitled “Initial support to meet obligations under the Stockholm Convention on POPs”.

Preliminary assessment focused on two key aspects – POP-pesticides and polychlorinated biphenyl's.

Project goals were: to develop an inventory of outdated, destroyed and unaccounted for pesticides stockpiles; identify persistent organic pollutants among stockpiled pesticides and related mixtures; assess amounts of unusable pesticides and packaging.



On May 18 Astana hosted a seminar summarizing results of the preliminary persistent organic pollutants (POPs) assessment in Kazakhstan. Seminar organizers included UNDP, Global Ecological Foundation (GEF), Kazakhstan’ Environmental Protection Ministry.

As a result of assessments, more than 1500 tones of pesticides and related mixtures were identified at the former

“Selkhozchemicals” (State Agricultural Chemicals Company) storage facilities, collective farms’ warehouses and agricultural air fields. POP-pesticides constitute approximately 41.7 tones. For the first time researchers uncovered aldrin, dieldrin and hexachlorbenzene presence among outdated pesticides.



Total amounts of polychlorinated biphenyl’s containing equipment exceed 38 thousand units; polychlorinated biphenyl’s accumulation in the equipment exceeds 700 tones.

Assessment of outdated pesticides buried in operational and abandoned storage facilities is yet to be conducted.

Key reasons for outdated pesticides accumulation include:

- * ineffective pesticides procurement/shipment system;
- * extensive storage periods for short shelf life pesticides;
- * unsatisfactory organization of storage and registration;
- * poorly designed packaging and containers; low quality packaging;
- * penetrated packaging;
- * passed expiration dates etc.

Preliminary assessment identified series of issues.

Mr. Marat Ishankulov, Manager of the project “Initial support for the Republic of Kazakhstan to meet obligations under the Stockholm Convention on POPs” believes that only preliminary assessment has been conducted and there is an acute need for additional studies of territories impacted by POPs.



Certain project implementation limitations resulted from **the lack of specialized POPs-related legislative acts in Kazakhstan**. Considering that broken inter- and intra-agency cooperation links hinder

effective POPs management, experts believe that development of a specialized law will allow to establish a uniform POPs management system in Kazakhstan. The Law of the Republic of Kazakhstan on POPs will allow to increase effectiveness of obligations fulfillment postulated upon Kazakhstan's accession to the Stockholm Convention.

The assessment targeted only mineral substrates samples analysis (adhering to the overall assessment goals and objectives). However, it was also important to conduct biological objects analysis. **The country lacks an accredited world class laboratory aimed at addressing the Stockholm Convention objectives.** Hence, chemical analysis foundation development is of critical importance.

It is also important to develop a uniform POPs management system – Outdated Pesticides Center (including POP-pesticides) tasked with monitoring and control over dangerous wastes.



It is important to address pesticides packaging recycling issues. The preliminary national assessment results indicate that there are more than 300 thousand packaging units. Packaging poses acute threats since people often use it for household needs to store food supply and water. There is a lack of public awareness of the threats associated with using discarded pesticides packaging.

Amounts of discarded pesticides packaging grow every year. This is particularly relevant for plastic packaging, which can not be buried because of plastic inertia and can not be burned as it will cause uncontrolled harmful emissions into the air. These emissions are particularly dangerous because of possible dioxins and furans concentrations, control over which is hindered by the absence of laboratories capable of measuring these parameters.

Despite of annual state budget disbursements aimed at burying outdated pesticides and associated packaging, the programs remain unfulfilled as a result of the **lack of burial ranges adhering to qualification requirements.** It is important to initiate ranges construction in the regions.

The initial assessment highlight the **need for development and implementation of ecologically safe outdated pesticides and packaging stockpiles liquidation technologies in Kazakhstan.**

It is important to define measures aimed at outdated pesticides storage facilities and polluted territories rehabilitation, considering ecological risks, economic and technical capabilities.

It is important to develop the analytical basis for state ecological and sanitary-hygiene control over POPs concentration in the environment.

Legislative acts have to be improved and POPs liquidation national action plan has to be developed.



In the near future the project implementation group will have to:

1. Initiate ratification of:

a) The Stockholm Convention on persistent organic pollutants;

б) The Rotterdam Convention on preliminary grounded agreement procedures with respect to certain dangerous chemical substances and pesticides in international trade aimed at eliminating risks related to inadequate storage, smuggling and transportation.

2. Develop the National plan of Kazakhstan's obligations fulfillment under the Stockholm Convention on POPs etc.

On 24 May 2004, Agricultural Policy Committee of Kazakhstan's Parliament lower chamber adopted the bill "On introducing changes and additions into certain legislative acts of the Republic of Kazakhstan on plants protection" and forwarded it for review by Majilis, the Parliament's full lower chamber.

The bill "On introducing changes and additions into certain legislative acts of the Republic of Kazakhstan on plants protection" has been designed to address civil law relations stemming from activities related to pesticides (poisonous chemicals) production (formulation) and sales in the Republic of Kazakhstan.

Currently there are more than 250 pesticides (poisonous chemicals) registered in the Republic of Kazakhstan. Annually 15-20 new substances are added to the list of registered pesticides. The list of pesticides (poisonous chemicals) produced (formulated) in Kazakhstan also grows every year.

Moreover, often pesticides sales are carried out by amateurs having no appropriate skills, no specialized education or storage facilities, having little understanding of potential dangers pesticides pose to people's health and the environment.

Considering social and ecological importance of these issues as well as the fact that pesticides (poisonous chemicals) are potentially dangerous substances capable of causing profound adverse impacts to people's health and environment in general, while production (formulation) and sales are classified as ecologically dangerous activities, the introduced amendments address licensing of pesticides (poisonous chemicals) production (formulation) and sales.



Enactment of the above mentioned provisions will allow to strengthen control over pesticides (poisonous chemicals) production (formulation) and sales, which will in turn decrease the risk of possible adverse impact of these substances on people's health and the environment and will create an additional barrier for banned and other highly dangerous toxic substances, including persistent organic pollutants, attempting to penetrate the Kazakhstani market.

Stockholm Convention provides for active public participation in its implementation.

Kazakhstan's non-government ecological organizations sent an Address to the Government of Kazakhstan aimed at expediting ratification of the Stockholm Convention on persistent organic pollutants (POPs). The address has been sent to the President of Kazakhstan, the Parliament, the United Nations, the country's Environmental Protection Ministry and other ministries and agencies.

Kazakhstan's non-government organizations believe that it is important to develop mechanisms and procedures for public participation in the Convention implementation, principles of cooperation with legislative and executive branches on issues related to poisonous chemical substances.



In Kazakhstan's NGOs opinion, considering the POPs global nature and urgency of the issue for Kazakhstan, first priority actions should be aimed at securing legislative improvements – it is important to harmonize national legislation with the Stockholm Convention and to develop specialized national POPs-related laws or to include POPs-related issues into already enacted ecological legislative acts.

POPs–related issues are relevant not only for Kazakhstan but for Central Asia as a whole.

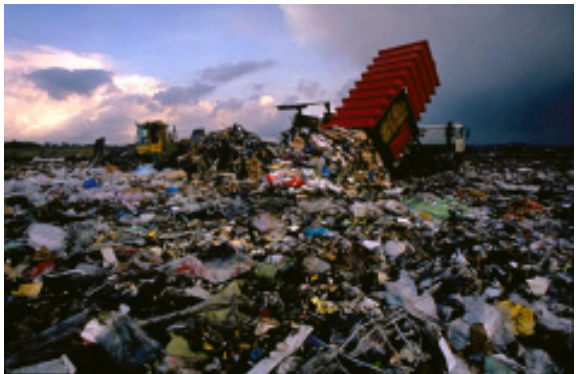
Kazakhstani “greens” believe that international cooperation can include: Central Asian POPs network development and establishment of representative offices; contemporary POPs liquidation technologies research, analysis (based on public health and environmental safety parameters) and implementation; POPs databases development throughout Central Asia; consultations and experience exchange; expert assistance; informational and public awareness campaigns including assessments results presentation and POPs-related materials in official state and other languages, development of POPs instructional courses at high schools, in universities and other educational institutions etc.

Joint actions involving government agencies and NGOs may include various POPs-related actions and campaigns; establishment public oversight body responsible for monitoring stockpiles and industrial wastes containing POPs, as well as industrial enterprises activities related to POPs (including public participation in revealing unsanctioned stockpiles of outdated and banned pesticides); participation in international POPs-related projects etc.

2.3 Industrial and household wastes

The country lacks a state wastes management system, including industrial and household wastes monitoring, storage, recycling and liquidation.

Some experts estimate that accumulated industrial wastes volume exceeds 30 billion tones, including 6.7 billion tones of toxic wastes and 230 million tones of solid household wastes. Annually we add up to 20 million cubic meters of household wastes and up to 1 billion tones of industrial wastes, including more than 150 million tones of toxic wastes.



«It is important to conduct an urgent industrial wastes assessment in each industry sector, and solid household wastes in every region», stresses Ms. Aitkul Samakova, Environmental Protection Minister.

Large accumulated industrial wastes volumes result from outdated technologies application, poor quality fuels and raw materials, unwillingness to invest in industrial wastes recycling and re-cultivation.

Up till now industrial wastes, including toxic wastes, are stockpiled and stored in various collectors, often with no regard for ecological norms and requirements. As a result, intensive pollution has impacted soils, underground and surface waters in many regions.

Based on data presented by Ms. Samakova, the Environmental Protection Minister, liquid wastes and harmful emissions into bodies of water pose a serious environmental threat. Ishym river and other Irtysh basin rivers top the most polluted bodies of water list. For example, in the Ust-Kamenogorsk zone copper levels exceed maximum acceptable concentration levels by more than 2.5 times. In Aktubinsk region underground and surface waters experience chromium pollution, in Jambyl region – sulfur; in Eastern-Kazakhstan region – heavy metals salts.

Highly polluted rivers include also Ili, Elek, Nura, Syrdariya, Shu and Samarkand Water Reserve.

The situation around Nura river (bottom metallic mercury accumulations) is an often cited showcase.

For more than 20 years Temirtau plants have been dumping liquid wastes into Nura river. In addition, Karaganda power plant-1 has dumped more than 5 million tones of coal ashes. These ashes sorbed mercury and developed unique mercury-containing pre-bottom deposits. On the span of more than 25 kilometers there are more than 2,5 million tones of pre-bottom deposits and 100 tones of mercury accumulated in the river current. It is important to note that Nura river is the only constant water current serving as the source for Korgaldzhy State Nature Reserve lakes system.

On 26 May 2004, President of Kazakhstan signed the Law «On ratification of the agreement between the Republic of Kazakhstan and International Bank for Reconstruction and Development». The project impacts more than 1.5 million people living on the river basin territories. The overall volume of polluted materials and soils exceeds 5 million cubic meters. International Bank for Reconstruction and Development provides a 40.39 million USD loan.

The major proportion of industrial wastes develops at the country's mining enterprises, primarily concentrated in Karaganda and Eastern-Kazakhstan regions. One of the underlying factors is related to the fact that mining enterprises life cycles are closely related to raw materials deposits volumes. After the deposits have been depleted, the enterprises start to experience dwindling profitability and funding deficits claiming to have no resources for liquidation projects. Usually these cases develop into bankruptcy procedures and ownership rights transfers forcing the state to assume the issues related to mining operations wastes (so called, historical pollution). The Government has adopted a special program covering one of the most vivid historical wastes cases, former uranium mines radioactive wastes.

To stabilize harmful impacts from mining and non-ferrous metallurgy enterprises, it is important to:

- *introduce new technologies, materials and equipment;*
- *develop and implement liquidation and conservation funding mechanisms for abandoned and unprofitable mines;*

- develop and implement technologies allowing to extract valuable components from mining processes wastes and zero-wastes technologies.

Metallurgy and power generation industries follow mining sector in terms of industrial pollution volumes.

Major corporations such as joint-stock companies “Ispat-Karmet” and “Kazakhmys” have established more than 350 wastes storage ranges in Karaganda region. Multi-year industrial wastes of Balkhash Metallurgic Combine have led to Balkhash lake water and surrounding shores pollution.

Oil and gas extraction and processing facilities cause pollute soils with heavy metals and oil and gas-related substances serving as key sources of pollution in Kzyl-Orda, Atyrau and Western-Kazakhstan regions. Abandoned and buried drilling slams volumes, polluted low-radiation waters and displaced soils can hardly be ever assessed.

Oil wells wastes issues are extremely acute. Growing oil extraction volumes have posed a new challenge – major sulfur volumes accumulation (more than 7 million tones have been accumulated at Tengiz deposit), environmental impacts of which have not been assessed.

In rural areas organic wastes represent one of the key soil, water and air pollution sources. Human and animal faeces are particularly toxic.

In Kazakhstan annual organic wastes output reaches 40 million tones, more than 20 million tones in animals and birds breeding facilities and more than 17 million tones in plant-growing agricultural sectors. Biotechnological recycling leading to fertilizers and methane production is perceived as the most effective, economically sound and ecologically safe organic wastes liquidation methodology.

In Kazakhstan annually developing cumulative solid household wastes volumes are estimated to reach 13.9-15 million cubic meters.

In large cities (with up to 500 thousand inhabitants) average accumulation fluctuated between 1.3 and 2.2 cubic meters per person per year. As a comparison in developed countries the same parameter fluctuates between 0.3 and 0.6 cubic meters.



Open range stockpiling is the only solid household wastes decontamination

technique used in Kazakhstan. Only less than 5% of all household wastes accumulated in the country are subject to recycling or burning.

Some ranges targeted for solid household wastes accumulation are official. Many others function without any plans or projects and do not meet the country's ecological and sanitary norms and technological requirements applied to solid household wastes storage and burial. Tractor inflicted pressures applied to incoming wastes constitute the only stockpiling methodology. As a result, light components are carried out from the ranges for great distances leading to underground waters, soils and plants pollution.

Absence of effective solid household wastes recycling facilities and technologies leads to constant increases in solid household wastes volumes accumulated at the ranges. Often wastes accumulation ranges are adjacent to housing complexes, villages, water currents, and lakes.

Being filled to capacity, wastes accumulation ranges are not re-cultivated serving as long-term environmental pollution sources. Moreover, maps do not reflect old abandoned stockpiles and these territories are often assigned for housing construction and various agricultural projects.

The country has never implemented separate wastes collection and sorting. There is no wastes accounting system.

Liquidation of wastes containing toxic substances (for example, thermometers and other mercury-based devices, batteries etc.) remains a major issue.

Illegal solid household wastes burial sites are not supported by any documentation and can not be controlled, thus representing the most difficult challenge.

Medical facilities wastes issue remains as acute as ever. Infections hospitals, quarantine facilities and other medical facilities wastes continue to be dumped together with regular household wastes, further spreading infectious diseases.

To resolve issues related to industrial and household wastes it is crucially important to develop sector-specific and regional programs aimed at improving industrial and household wastes management.

These programs should provide for:

- *solid wastes management system development and personnel training promoting new progressive wastes management systems;*
- *wastes management facilities reform;*
- *development and implementation of legal documents leading to decreased wastes accumulation;*
- *organization of wastes accounting and control system,*
- *development of the model program addressing wastes recycling issues;*
- *scientific research targeting clean production technologies implementation etc.*

Kazakhstan's Environmental Protection Ministry proposes to introduce additions and modifications into certain legislative acts regulating environmental protection issues and specifically dealing with industrial and household wastes. These additions provide for government agencies functions systematization on matters related to wastes treatment, uniform wastes accounting based on contemporary classifications adhering to international standards, state wastes registry development.

Liberalization and granting private enterprises access to solid household wastes management allows to increase effectiveness of these operations. Such projects are being implemented in Pavlodar, Petropavlovsk, Kostanai, Almaty and Western-Kazakhstan regions.

Currently in the country there are just a few enterprises working on various wastes recycling projects. In most cases they encounter financial challenges resulting from the lack of working turnover capital.

In theory non-ore wastes components can be used in glass and ceramics industry, bricks, concrete and fertilizers production. Low-value minerals can be applied in road construction, to fill mining voids, to prepare filling mixtures and sands.

PROGRAMS AND PROJECTS IMPLEMENTATION

Kazakhstan's Strategic Development Plan until the year 2010 identifies increased wastes recycling levels among key priority objectives in the environmental protection sphere.

To achieve this objective it is important to institute monitoring of industrial and household wastes, assess environmental impact of harmful wastes burials, actively implement resource and energy saving technologies, stimulate wastes recycling enterprises. It is important to implement sustainable agricultural production systems based on organic or ecological processes including constant soils re-cultivation and fertility stabilization, increase in the quality and quantity of organic substances in soils etc.

Currently Kazakhstan is implementing a Program on uranium industry radioactive wastes liquidation and a Program on abandoned oil and self-emitting hydro geological wells liquidation. However, these programs do not cover all types of historical pollution and similar initiatives have to be developed for other industry sectors.

Sector-specific and regional improved industrial and household wastes management programs have to be designed to resolve issues related to industrial and household wastes.

In 1998–2002 several international organizations have joined wastes treatment projects.

Meetings, roundtables and donor conferences have been organized to attract potential donors to ecological projects implementation. The World Bank, US, Japanese, German and French governments, TESIS, UNDP and USAID have announced their intents to participate in priority projects funding.

“Almaty city solid wastes management feasibility study” based on Cooperation Agreement between Japanese International Cooperation Agency (JICA) and the Republic of Kazakhstan represents a vivid example of international donor involvement.

Similar projects have been implemented in Pavlodar and Shymkent.

Spanish stakeholders are involved in intended implementation of modernized solid household wastes liquidation project in Astana.

Environmental protection measures aimed at decreasing adverse impacts of industrial and household wastes were included into the umbrella project concept entitled “Industrial wastes liquidation in Ust-Kamenogorsk, Pavlodar and Karaganda”.

In 2000-2002 special operations have been conducted to liquidate and bury mercury-containing and radioactive wastes, pesticides and poisonous chemicals in the framework of radioactive sources burial at Semipalatinsk nuclear testing range “Baikal” complex.