ТІРШІЛІКТАНУ
БИОЛОГИЯ

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The role of ecological-hygienic monitoring
in the management of environmental quality

The questions on the ecological projects with use of methodology of an estimation of risk and economic efficiency are surveyed at acceptance of the decisions about unhealthy industrial emissions. Thus it is necessary to give attention to systems of long-term observations including: research of spatial — temporary distribution of chemical substance; optimization of a network of observation; optimization of parameters and agents of observation; automation of system of monitoring; organization of flows of the information reports.

Key words: industrial facilities, carcinogenic substances, monitoring system, optimization network surveillance.

Currently hygienic science in Kazakhstan is in its infancy in terms of new economic relations. Therefore, it is necessary not only to develop new methodological approaches for the regulation of chemicals in separate environments: chemical pollution in water, air, soil, air, industrial residential, public buildings, and on this basis to develop a methodology of a single hygienic standards. Should the coverage of issues relating to hygienic bases of the development and distribution of productive forces and the territorial-industrial complexes. It is necessary to take a very active role in ensuring the most favorable conditions of life and labour of the population and to actively participate in policy formation in the field of environmental protection. At the same time one of the important methodological task is the characterization of the contamination of environmental objects in assessing its effects on the body and establishing their distribution on the different groups of the population (in percent) level affecting concentrations as in the specific conditions of settlements and regions and the country as a whole [1]. It is necessary to consider the level of impact of emissions (certification) of industrial enterprises depending on location, specific significance in the formation of specific health situation analysis of the specific features of the natural environment of the region. Based on the ecological-hygienic monitoring to divide the whole area into areas with different pollution levels and to map sanitary zoning. Based on the analysis of data on the level of environmental pollution, population exposed to adverse factors, the forecast changes in the environment due to the economic development of the region. Earlier studies have shown that destabilization of the metabolic status of an individual is the consequence of a sufficiently high level of chemical contamination, which shows the need for search and analysis of the literature on the biochemical mechanisms of action of certain substances on the body and biotransformation processes.

The main goal for the near future is tested in conditions of full-scale research methodology study on the improvement of the environment on the basis of its comprehensive assessment using multi-criteria models. Expressed the multifactorial nature of the environment necessitates the evaluation of its States through health as an integral indicator of its quality. To improve the sanitary situation of the industrial regions of Kazakhstan and solve problems in bioremediation of environmental objects important programming on the basis of legal, sanitary and sanitary blocks of activities. In recent years, Kazakhstan has become one of the countries actively extracting oil.

The problem of pollution by oil is extremely relevant [2]. The greatest danger from oil contamination occurs during production, storage, transportation and processing of oil. When soil contamination by crude oil at a level of about 100 mg/kg, a marked reduction of self-purification processes, and at 300 mg/kg — their almost complete cessation. Among the many remediation technologies for cleaning of natural environments from petroleum products, it is important to use biodestruction as an independent method, or in combination with mechanical, phyto-reclamation methods [3]. The number of microorganisms capable of using to power the carbon alkanes, aromatic hydrocarbons and their derivatives, are included with crude oil. It's basically the microorganisms Acinetobacter, Candida, Rhodococcus, which clone on selected environments and get the strains with the given parameters. When deciding about the use of biologics in bioremediational technologies, the main requirements strains of microorganisms are: absolute epatajnosti, lack of virulence, toxicity. The strains should not be able to dissemination to internal organs of humans and animals, and to restrict irritants. Hygienic competence in the use of biodestruction order bioremediation of environmental objects (water-soil) should be based on a comprehensive examination of the results of laboratory and pilot tests, and the decision about the use of the drug.

However, it is necessary to improve methods for integrated assessment of environmental quality. In this approach, you must determine the actual loading of the entire variety of anthropogenic impact. This takes into account that remote and cumulative effect of changes in the environment in General prevail over the direct and acute effects. With this in mind, you must focus on tracking subtractive situations using biochemical, cytogenetic, immunological indicators reflecting early changes in the body. It requires the creation of information technology for analytical epidemiology of mass non-communicable diseases due to exposure to toxic compounds. You need to create a model of causality with regard to sanitary conditions. One of the activities designed to achieve the Kazakhstan law «About sanitary and epidemiological happiness of population» is the certification of industrial enterprises in harmful emissions. Unfortunately, the number of toxic, carcinogenic hazardous substances into the environment cannot be described using the data given in the «Passport» industrial enterprises of Kazakhstan. In this regard, the data are uncertainties associated primarily with the lack of monitoring of carcinogenic substances in the environment. To address questions about the contamination of environmental objects are developed environmental projects using the methodology of risk assessment and cost-effectiveness when making decisions about the harmful emissions of pollutants with respect to each of the production cycle. The first phase of the project is detailed quantitative assessment of important chemicals in the target company. To further determine the geographic coordinates of polluting sites, taking into account the number of sources and the exposed population, i.e. the population residing in the area of the sources of industrial emissions. To assess the impact of contaminants use of the dispersion model to break up emissions in the air, it is necessary to consider it average concentrations, and not the maximum impact indicators that lead to chronic diseases, and especially to the rise of cancer and other chronic diseases with a high probability of a fatal outcome [3]. Noteworthy is the development of an automated system of management of ecological risks on the example of Aksu Ferroalloy plant, where for the first time in Kazakhstan was implemented automated system to track the impact of industrial emissions on the environment, to develop a database, select the monitoring scheme, to build a computer card, to determine the zone of influence enterprises [4]. According to the international standards ISO 14001 is one of the highest priorities is the management of environmental quality, based on the requirements of the legislative acts and environmental aspects associated with the activities of the organization, its products and services. Surveillance system, existing in Kazakhstan to establish causation in general cannot be considered as fully established, permanently adjusted and quite effective. This is largely the consequence of the fact that Kazakhstan still does not exist a unified approach to the monitoring of environmental objects and what goals should be achieved during the formation of the observations. You need organized in an optimized regulation system long-term observations of the environment and sources of anthropogenic impact on her. In this case, the «optimization» is acceptable in all respects and with the positions of existing economic opportunities [5]. The basis of the risk assessment methodology can be put to the algorithm, which is implemented from interrelated areas: the zoning of the city based on the study of spatial-temporal distribution of chemical substances; optimization of network monitoring; performance tuning and monitoring tools; automation monitoring system; organization of flows of information messages. Evaluation of combined action is based on their concentrations, where the total risk does not exceed acceptable risk. The combined effect of non-carcinogenic substances is estimated by the change in the toxicity of the mixture components with the determination of biologically equivalent concentrations, which suggests the presence or absence of a certain effect [6]. However, further work is also

needed questions combined action as a scientific basis of preventing and mitigating the adverse effects of multicomponent air pollution on population health.

Ecological projects with use of methodology of an assessment of risk and economic efficiency at decision-making about unhealthy emissions of the polluting substances taking into account each production cycle are developed for the solution of questions of pollution of objects of environment. The first stage of the project is the detailed quantitative assessment of especially significant chemicals at the studied enterprise. For a choice of priority substances use the following criteria: the volume of emission and toxicity of substances taking into account frequency rate of excess of maximum concentration limit. In the subsequent determine geographical coordinates of the polluting sites, taking into account quantity of sources and the exhibited population, i.e. the population which is constantly living in an area of coverage of sources of industrial emissions. For an assessment of influence of the polluting substances use dispersive model of dispersion of emissions in air, thus it is necessary to consider average concentration, but not the maximum indicators of influence which lead to chronic diseases, first of all to developing of cancer tumors and other chronic diseases with high probability of lethal outcomes [6]. The received average concentration are included into model of calculation of concentration of air pollutants. Judge meteorological data from supervision posts. In the USA the complex (long-term) model of calculation of emissions from industrial sources [The Industrial Source Complex (Lond Term) I SCLT 3] which gives the chance to predict the concentration of the polluting substances average in a year in any set influence point with use of data on issue and local meteorological data is used.

Development of an automated control system for environmental risks on the example of Aksusky plant of ferroalloys where for the first time in the conditions of Kazakhstan the automated system allowing to trace influence of production emissions on environment, to form a database, to choose the scheme of monitoring, to build computer cards, to define zones of influence of the enterprises [6] was introduced deserves attention. According to the international ISO 14001 standards one of the highest priorities is quality management of environment, on the basis of requirements of the acts and ecological aspects connected with activity of the organization, its production and services.

At the same time carrying out an assessment of an environmental risk requires existence of primary medico-ecological information. The leading hygienists of the CIS paid attention to need of the interfaced analysis of ecological and sanitary and hygienic researches as interdisciplinary work. It is necessary to be determined by the obtained data in carrying out systematization and synthesis of all data, estimating the general and local «chemical» situation and a tendency of its change in time and thus to carry out forecasting of a situation. At the same time to define information for adoption of administrative decisions.

The next direction is the optimization of the network state monitoring of environmental objects, including the representativeness of the results, the validity of the conclusions and minimizing the number of measurements. Representative results are achieved by forming a network monitoring (sampling), allowing to accurately describe all items, polluting the area. Observations are performed on a regular network, where the density or the adequacy of the number of measurements is determined by statistical evaluation, referred in general to the city area. An important element of the monitoring system are the areas directly adjacent to the enterprises, where necessary, a detailed scope of work — territorial and local levels of monitoring. Improvement of regulations monitoring is ensured by selection of the control parameters, monitoring tools and periodicity.

One of the objects of ecological risk determines the quantity and quality of the biosphere is the soil. The deterioration of soil quality, reduction of its biological value, the ability to cleanse itself cause a chain reaction that can create the conditions to activate it pathogenic, dangerous in epidemiological against microorganisms. Among the numerous anthropogenic environmental pollutants should be distinguished from petroleum products. The oil entering the soil in large quantities primarily affect the biological properties of the soil: changes the total number of microorganisms, narrows their species composition, changing the structure of microcensus, decreases the intensity of the main microbiological processes and the activity of soil enzymes. All this leads to a partial, and in some cases a complete loss of soil fertility. However, it is important to bear in mind the considerable spatial and temporal variation in biological characteristics of the soil, which requires a lot of repetition of observations. In connection with the above, when monitoring the environment and human health is a fundamental principle remains the establishment of causal relations and development for the further implementation of the methodology for the assessment of public health for the purpose of scientific study of options for management decisions. On the issue of environmental protection: to identify common patterns and characteristics of the toxicity of substances for different routes of exposure necessary

to substantiate the quantitative criterion is the coefficient of relative toxicity. It is important to note that the risk assessment methodology is a practical tool for comparative assessment of possible damage to the health of the population and aims to forecast possible changes in the future. Therefore, it is necessary to develop and implement economic instruments for management of the health of the population, based on different forms of compensation for damage to health of individuals and populations associated with anthropogenic pollution. This is particularly true for Kazakhstan, where large industrial enterprises are privately owned. In modern conditions, with the advent of various forms of ownership is important to the implementation of a mechanism of economic responsibility, compelling to meet the requirements of the legislation. However, one of the mechanisms for the rehabilitation of the negative impact of industrial enterprises can be directly funding projects for remediation of pollutants territories.

Thus, the improvement of sanitary-hygienic assessment of the living conditions of the population in the modern industrial development should be implemented in the new legal, economic and organizational decisions, priorities which would be determined by the state of the environment and public health.

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Экологиялық сапаны басқарудағы экологиялық-гигиеналық бақылаудың рөлі

Мақалада қауіп-қатерді бағалау әдіснамасы және экономикалық тиімділікті экологиялық жобаларда қолдану мәселелерінде зиянды өндірістік қалдық туралы сұрақтар зерттелді. Сол себепті ұзақ бақылау жүйелеріне, оның ішінде кеңістік-уақыт өлшемінде химиялық заттарды үйлестіруді зерттеуді, бақылау жүйелерін оңтайландыру, өлшемдер және бақылау құралдарының тиімділігі, автомат жүйелерінің мониторингі, ақпараттық хабарламалар ағынын ұйымдастыруға аса назар аудару қажет.

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Роль эколого-гигиенического контроля в управлении экологическим качеством

В статье отмечено, что вопросы об экологических проектах с использованием методологии оценки риска и экономической эффективности наблюдаются при принятии решения о вредных промышленных выбросах. Таким образом, подчеркивают авторы, необходимо уделить внимание системам длительного наблюдения, в том числе: исследованию пространственно-временного распределения химических веществ; оптимизации сети наблюдений; оптимизации параметров и средств наблюдения; автоматизации системы мониторинга; организации потоков информационных сообщений.

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