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Conducting a state environmental audit at industrial enterprises of the Karaganda region

Abstract. The article is devoted to the study of the features of conducting a state environmental audit at industrial enterprises of the Republic of Kazakhstan; the mechanism, goals, stages, and grounds are considered for conducting this type of audit at business entities. It also examines the activities of industrial enterprises and their impact on the environment. The importance is considered of organizing effective control and reducing the environmental impact of industrial enterprises is considered, and the urgency is proved of the problem of irrational and inefficient use of natural resources. It is shown that the task of limiting the impact of existing industries on the environment is solved by an environmental audit and control system. A clear definition of state environmental audit, as one of the types of environmental audit. At the same time, the article discusses the features of conducting an audit of the efficiency of the use of natural resources, including the criteria for the rationality and efficiency of the use of natural resources used in world practice.

Keywords: industrial production, enterprise, environmental audit, state environmental audit, environmental protection measures, natural resources, natural resource use efficiency, natural resource use efficiency criteria, environment, natural resource use efficiency audit, environmental costs, environmental risks.

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Industrial production is currently one of the main factors determining the state of the environment in most regions. That is why it is extremely important to organize effective control and reduce the environmental impact of industrial enterprises [1]. The task of minimizing the impact of industrial enterprises can be solved at two main stages - in the planning and design of economic activity and in the course of its implementation. As a tool for solving this problem, the planning is the assessment of environmental impact.

The purpose of this research work is to study the process of conducting a state environmental audit at industrial enterprises of the Republic of Kazakhstan (on the example of the Karaganda region).

Based on the above goals, the objectives of this work include:

- Reveal the concept of state environmental audit in industrial enterprises;
- Determine the basis for this type of audit in enterprises;
- Indicate the goals and objectives of the state environmental audit at enterprises;
- To study the stages of the state environmental audit at industrial enterprises;
- Define criteria for the efficient use of natural resources;

Research methods.

To study the process of conducting a state environmental audit in industrial enterprises, as well as criteria for auditing the effectiveness of the use of natural resources in the process of conducting a state environmental audit, in this work we used methods of comparison and analysis of statistical data, as well as methods of mathematical statistics, deduction and synthesis.

Discussion and discussion results.

During the period of market transformations, the problems of sustainable economic and environmental development are especially urgent for many territories where the deeply ripened problems of protecting natural resources and ecosystems are acute [2]. For their successful

practical solution, it is necessary to expand and enrich the means of the mechanism of economic environmental management on the basis of the development and implementation of its new elements and tools, including environmental regulation. One of the most effective instruments of economic and environmental control in the process of establishing a market economy should be environmental audit.

At the international level, environmental audit is considered as an economic and legal tool to stimulate environmental protection in order to increase investment attractiveness. Environmental audit is the main component of the environmental management system and includes assessment of environmental performance indicators, analysis and risk management. This understanding is based on internal European and American standards, ISSAI standards, as well as international ISO 14000 standards, which contain requirements for an environmental management system.

Environmental audit, which is an instrument of environmental control and protection, has a fairly wide and already stable, widespread use in international practice. This type of audit is still new for Kazakhstan. Currently, the Republic of Kazakhstan is developing a state environmental audit as an integral part of state audit.

The limited reserves of many natural resources, as well as their irrational use, raises the urgent problem of increasing the efficiency of their use by conducting a proper environmental audit.

To a certain extent, the task of limiting the impact of existing industries on the environment is solved by an environmental control system designed, in accordance with the law, to verify the implementation of plans and measures for nature conservation, the rational use of natural resources, the improvement of the natural environment, compliance with environmental legislation and environmental quality standards natural environment.

In the last decade, positive trends have been outlined in world practice aimed at solving the problems of protecting natural resources and ecosystems to ensure further environmentally sustainable socio-economic development of the regions. The determining factor in the institutionalization of this approach is the new environmental thinking. Its formation is especially important at the stage of major transformations in the economy.

According to the Environmental Code of the Republic of Kazakhstan, in our country an environmental audit is carried out in two forms: mandatory (state) and proactive (voluntary). In this paper, we consider in more detail the state environmental audit, which by its nature is mandatory [3].

A state (mandatory) environmental audit, as one of the types of environmental audit, is an independent, comprehensive, documented assessment of the impact and forecasting of the environmental consequences of the activities of economic entities, establishing compliance of the type of activity with the requirements of the current environmental code, as well as other legal acts in the field of environmental protection environment, environmental performance assessment. It is carried out by analyzing the reporting of audited entities on the impact of quently on the environment.

The grounds for a mandatory environmental audit of individuals and legal entities are:

- 1) significant damage to the environment caused by economic and other activities of individuals and legal entities, documented;
- 2) the reorganization of the legal entity-nature user, carrying out environmentally hazardous types of economic and other activities, in the form of merger, separation and separation;
- 3) bankruptcy of legal entities-nature users engaged in environmentally hazardous types of economic and other activities.

Voluntary environmental audit is necessary to attract investors, customers, access to foreign markets. It is also carried out in the following situations:

- the emergence of a new owner in the company.

- conclusion of a lease.
- drawing up a plan for the purchase of resource-saving equipment.
- there are significant violations of environmental standards.

The main objectives of the environmental audit at the enterprise include [4]:

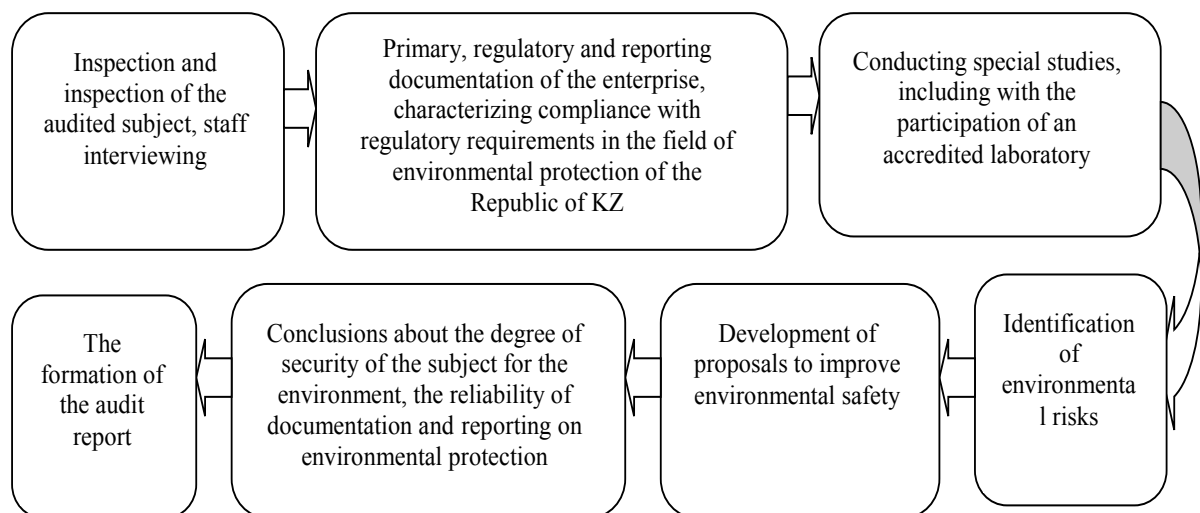
- Assessment of the enterprise for compliance with environmental standards.
- Analysis of the existing negative impact arising from the work of the company on the environment.
 - Detection of areas that pollute the enterprise.
 - Analysis of the amount of negative impact.
 - Checking the availability of equipment that is required to minimize the negative impact on the environment, analysis of its condition.
 - Analysis of the negative impact of the company's work on the health of its staff.

Let us consider the mechanism of conducting a state environmental audit at industrial enterprises operating in Kazakhstan (using the example of a state (mandatory) environmental audit conducted at the Koktaszhal deposit of Altai Polymetals LLP).

The process of conducting a state (mandatory) environmental audit at enterprises begins with the decision of the authorized body to conduct a mandatory state environmental audit at the enterprise due to significant damage from the economic entity to the environment (paragraph 1 of paragraph 2 of Article 81 of the Environmental Code of the Republic of Kazakhstan) on an amount one hundred times the monthly calculated indicator. Significant environmental damage caused by the activities of an economic entity is confirmed by relevant acts on the results of verification of compliance with the environmental legislation of the Republic of Kazakhstan [3].

Further, the authorized body for environmental regulation obliges the economic entity to conduct an environmental audit at its enterprise, which, in turn, hires environmental auditors, who, according to the scheme, conduct mandatory environmental audits at the enterprise. The company provides the audit results to the authorized environmental regulatory bodies, which monitor the correctness (compliance) of the environmental audit.

Work on the state environmental audit at the enterprise in question include (Fig-1).



Note. Figure compiled by the author according to [5]

Picture 1. The scope of the environmental audit at an industrial enterprise

The stages of the state environmental audit at the enterprise include:

- Preliminary familiarization with the audited entity;
- Development of an audit plan;

- Collection and systematization of necessary information;
- Inspection of the audited entity and conducting a survey of its employees;
- Determination of the scope of special studies;
- Carrying out: instrumental measurements at emission sources and special studies involving accredited testing laboratories, including.

At the stage of preliminary familiarization, the general data of the enterprise are considered, for example: historical information, geographical location, photo reports from satellites, units, type of activity of units, technology of work and stages of development of the quarry, overburden and dumping, mining, drilling and blasting, auxiliary works, the technological scheme of mining in the contour zone of the quarry, the schedule of mining, concentration plant, a description of the concentration process.

Further, the auditors draw up an audit plan, which in our case consists of 15 points:

The audited subject

- Location of the audited entity
- Type of environmental audit
- Reasons for conducting an environmental audit
- The objectives of the environmental audit
- Tasks of the environmental audit
- Audit scope
- The period of activity of the audited entity, considered in the process of environmental audit
- The nature and sequence of activities to collect the necessary information
- Expected Results
- The nature of the recommendations and proposals being developed
- Timing of the audit
- Stages of the environmental audit
- Requirements
- Requirements for the environmental audit report

The next step in conducting a mandatory environmental audit is a list and review of the information collected, i.e. verification of regulatory legal acts, reports, acts, declarations, conclusions, protocols related to the environmental activities of the enterprise. After studying and checking the documentation, production environmental control is carried out, which is a comprehensive observation system, the results of which should:

- confirm or refute the assessment and forecast of anthropogenic changes in the state of components of the environment;
- in conjunction with environmental monitoring activities, determine the compliance of the activities with the standards and requirements of the Republic of Kazakhstan;
- enter as part of the system of state environmental monitoring, which provides an assessment and forecast of the state of the ecosystem in a regional context.

The next step is to assess the environmental impact of the audited entity. Altai Polymetals LLP has a project “Environmental Impact Assessment of an Enterprise”, which consists of the following items: air, emission inventories, waste, water resources.

Next, the audited subject is examined. Inspection of the audited subject and a survey of employees are carried out in order to assess the compliance of the documentation with the actual state of the audited subject, determine the qualifications of the specialists of the audited subject, develop proposals to improve the effectiveness of the audited subject (Clause 5, Article 82 of the RK EC). Inspection of the audited subject includes: compliance of the audited subject with the plan diagram and technological description, the completeness of the reflection of environmental impact sources in the documentation of the audited subject, the state of the territory of the possible impact

of the audited subject, the existence of circumstances about possible undocumented environmental impacts, the presence and completeness of accounting and other necessary documentation at production facilities, compliance with technical requirements for environmental protection in the process of operation of the facility, compliance with the requirements for conducting industrial environmental control, conducting a survey of employees of the audited subject, the results of special studies, information on complaints from citizens and public associations regarding the activities of the audited subject.

The next step is an assessment of environmental risks (in quantitative and qualitative terms).

Environmental risk assessment - the identification and assessment of the likelihood of events having adverse effects on the state of the environment, public health, the activities of the enterprise and caused by environmental pollution, violation of environmental requirements, natural and man-made emergencies.

Based on the results of each stage, recommendations are given on further activities of the enterprise in this direction. And at the end of the eco-audit itself, general suggestions and recommendations are given. According to clause 12 of Article 82, the development of proposals to improve the environmental safety of the audited entity is based on the study of:

- the best available technologies used for similar facilities;
- possible measures to improve the environmental management system;
- ways to improve industrial environmental control;
- proposals for changing environmental standards and requirements.

As we see from the above data, we conclude that in our country an environmental audit at economic entities is carried out only taking into account environmental (pollution of atmospheric air, water and soil) criteria, while in developed countries an environmental audit is carried out taking into account economic (stability, cost-effectiveness), productivity) and social (population, life expectancy, incidence) criteria.

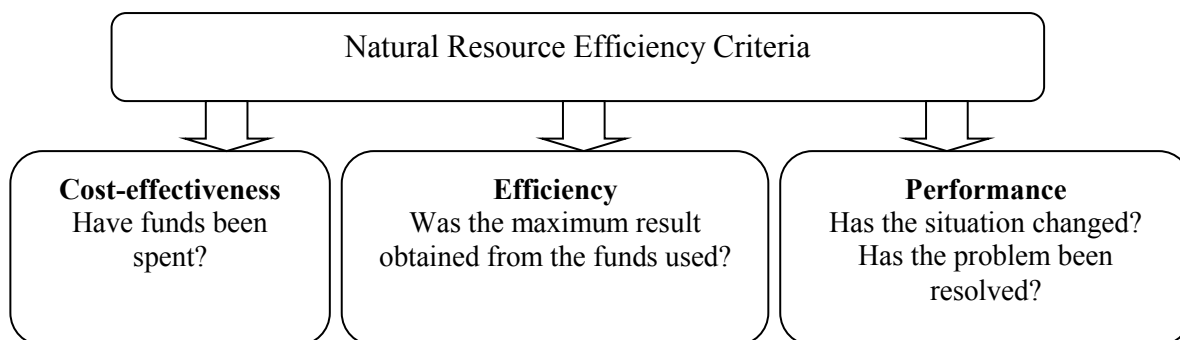
Economic criteria are used to assess the results of production activities for a certain period in dynamics, to compare the level of efficiency for enterprises, sectors, intersectoral complexes, as well as for districts, regions and the country as a whole. The main indicator of economic efficiency is profitability.

Social criteria are used to assess the dynamics of the number, incidence, life expectancy of the population depending on the growth of production activities and pollution of environmental components.

For the successful functioning of any economy, it is necessary to systematically implement rational environmental management, taking into account a set of factors: environmental, economic and social factors [7].

Considering the process of conducting a state environmental audit at an industrial enterprise, it is also necessary to consider the issue of the efficient use of natural resources, since it is, in its way, an indicator of the profitability of production, which is what all modern environmental management is striving for. Also, efficient production should include the rational use of natural resources, only in such a combination the subjects of environmental management will achieve maximum profit, since these criteria are interrelated and complement each other. It is impossible to achieve effective use of natural resources without the proper conduct of a state environmental audit [8].

Under the effectiveness of the use of natural resources, one should understand the totality of indicators reflecting the results of the activities of the controlled object or (and) the use of natural resources. Criteria reflecting effectiveness are efficiency and profitability. In international practice, these three criteria are called the «3E-s rule»: economy - profitability, efficiency-effectiveness, effectiveness - effectiveness (Fig-2).

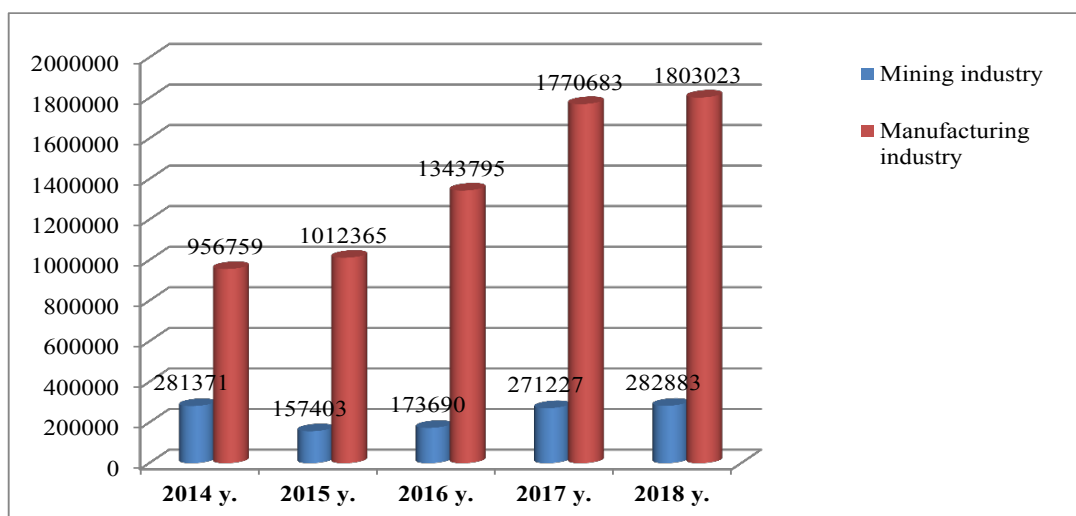


Note. Figure compiled by the author based on data [8]

Figure 2. Natural Resource Efficiency Criteria

An important indicator of the efficient use of natural resources in an industrial enterprise is environmental costs or environmental costs, which will include the internal and external costs associated with everything that happened in connection with damage and environmental protection. Environmental costs should include costs for environmental protection prevention, planning, control, understanding of actions and losses that may occur at the enterprise and will affect the society as a whole.

Consider the indicators of industrial production and the dynamics of environmental costs of industrial enterprises of the Karaganda region over the past 10 years, since it is the Karaganda region that is one of the industrial polluted regions of Kazakhstan (Figs. 3 and 4).

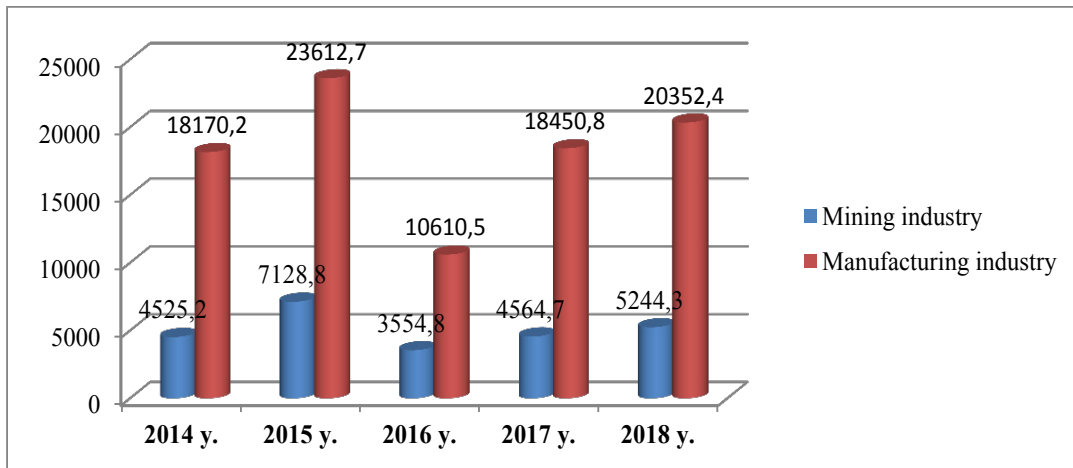


Note. Figure compiled by the author according to [9]

Figure.-3. Volumes of industrial production of the Karaganda region for 2014-2018 (mln.tg)

Over the past three years, the volume of industrial production increased to 37.5%, including the manufacturing industry, rose to 34.2%. Also, the growth in the volume of all components of the manufacturing industry of the region amounted to - ferrous metallurgy - up to 38.7%; production of basic precious and non-ferrous metals - up to 30.3%; metal casting - up to 59.4%; manufacture of finished metal products, except machinery and equipment - up to 4.9%, other products - up to 26.3%. The growth in manufacturing volumes in 2018 compared to 2014 amounted to 1.9 times.

Along with the growth of production, we consider the level of environmental protection costs by type of economic activity of the Karaganda region for 2014-2018. (fig-4).



Note. Figure compiled by the author based on data [9]

Figure 4. Environmental protection costs by type of economic activity of the Karaganda region for 2014-2018 (mining and manufacturing industry), million tenge

From the data on environmental protection costs by type of economic activity (Fig. 4), there is an increase in environmental costs in the mining and manufacturing industries in 2014-2015 y. by 35,5%, and in 2016 these indicators decreased by 2 times to 3,554.8 million tenge in the mining industry and by 2.2 times to 10,610.5 million tenge in the manufacturing industry.

As it can be seen from the above diagrams, the amount of production of the mining and processing industries of the Karaganda region has increased, and environmental protection costs for these types of activities have become lower in recent years, which indicates the irrational organization of environmental protection measures and the inefficient use of natural resources in this region.

On the issue of environmental costs at the enterprise, governments of different countries use market tools to guide the behavior of enterprises and citizens, as well as to eliminate the market inability of external costs or the so-called «environmental external factors.» Market instruments can be: taxes, fees, tradable permit schemes, deposit return systems, subsidies [10].

These tools are used to provide incentives for producers and consumers to change their behavior in order to use their natural resources more efficiently by reducing consumption and finding more effective ways to make environmental progress, giving them flexibility in how they do it.

Environmental taxes can be used, for example, to facilitate recycling and discourage investment and landfill use, taxes or minimum prices can increase the cost of products to prevent their use, for example, taxes that increase the price of mined units compared to other products or the minimum carbon price tax assistance can also be used to encourage the creation of infrastructure on previously used sites to support regeneration.

Refund schemes - a deposit (tax) may be levied on the product and paid back if certain behavior is fulfilled (for example, returning a deposit on bottles with drinks). Subsidies (direct and indirect) and a minimum input price can be used as a tool to increase the cost of more environmentally destructive activities to encourage the use of less hazardous options.

In conclusion, we say that conducting an environmental audit can significantly affect the following economic and environmental aspects of the business entity:

- improving the efficiency of the use of raw materials and energy resources and reducing the negative impact of production on the environment;
- justification of the need and possibility of concentration of efforts and means in the most priority areas of activity;

- prevention of local environmental problems and emergencies;
- improving relations with local authorities and state control and supervision, the public;
- creation and strengthening of a favorable image of the enterprise;
- reduction of payments for natural resources and environmental pollution.

According to the data obtained in this article, we can conclude that in the Karaganda region and Kazakhstan as a whole, the system of state environmental audit is not sufficiently developed, which in turn entails an inefficient and inefficient use of natural resources. The reasons for the underdevelopment of this type of audit are many: the later formation of democratic institutions and market relations, when in the environmental management system the environmental component was considered as economically ineffective; underdevelopment of legal aspects of environmental management; vast territory of the state, great resource potential, which contributed to containment of emerging environmental problems within the vast existing geographic and economic zones; low population density other than industrial satellites [11].

To date, Kazakhstan has formed a legislative framework for environmental auditing, but some of them are inefficient, therefore, studying the experience of developed countries, we recommend amending the laws governing the conduct of environmental audits and audits of the efficient use of natural resources in Republic of Kazakhstan, namely:

- develop a unified system for auditing the effectiveness of the use of natural resources;
- create an authorized body and appoint a person responsible for environmental protection, who will lead a group of auditors specializing in conducting state environmental audits;
- all government agencies to include in their annual report, a paragraph reflecting their work in relation to improving environmental protection as part of their activities;
- carry out control measures in the field of environmental audit, analyzing the effectiveness of the application of environmental tax benefits, as well as the rational use of the country's natural resources.

Environmental audit can be used in the selection of environmental measures means that, despite the great difficulties and uncertainties faced by actions aimed at protecting the environment in our country, despite the difficulties of the economic situation, the environmental audit will actively develop, since there are all the necessary prerequisites for this.

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Қарағанды облысының өнеркәсіп кәсіпорындарында мемлекеттік экологиялық аудит жүргізу

Аңдатпа. Мақала Қазақстан Республикасының өнеркәсіптік кәсіпорындарында мемлекеттік экологиялық аудиттің ерекшеліктерін зерттеуге, кәсіпкерлік субъектілерінде осы түрдегі аудитті жүргізуге арналған механизмдері, мақсаттары, кезеңдері, негіздері қарастырылады. Сонымен қатар, өнеркәсіп кәсіпорындарының қызметі және олардың қоршаған ортаға әсері қарастырылады. Өнеркәсіптік кәсіпорындардың тиімді әсерін бақылауды және қоршаған ортаға тигізетін әсерін азайтудың маңыздылығы зерттелді және табиғи ресурстарды пайдасыз және тиімсіз пайдалану проблемасының өзектілігі дәлелденді. Қолданыстағы өндірістердің қоршаған ортаға әсерін шектеу міндеті экологиялық аудит және басқару жүйесі арқылы шешілетіндігі көрсетілген. Мемлекеттік экологиялық аудиттің нақты анықтамасы экологиялық аудиттің бір түрі ретінде қарастырылады. Бұл шаруашылық жүргізуші субъектілердің қызметінің экологиялық салдарларының ықпалын және болжауды, қолданыстағы экологиялық кодекстің талаптарымен, сондай-ақ қоршаған ортаны қорғау саласындағы басқа да нормативтік актілердің талаптарына сәйкестігін белгілеуді тәуелсіз, жан-жақты, құжатталған бағалау болып табылады. Экологиялық қызметтің тиімділігіне баға беріліп, Қазақстан Республикасында экологиялық аудитті жүргізу нысандары ашылады. Сонымен қатар, жұмыс табиғи ресурстарды пайдалану тиімділігіне аудит жүргізудің ерекшеліктерін, соның ішінде дүниежүзілік тәжірибеде пайдаланылатын табиғи ресурстарды ұтымдылық пен тиімді пайдалану критерийлерін нақтылауды қарастырды. Мақалада сондай-ақ шетелдік тәжірибеде қолданылатын мемлекеттік экологиялық аудит көрсеткіштері келтірілген.

Түйін сөздер: өнеркәсіптік өндіріс, кәсіпорын, экологиялық аудит, мемлекеттік экологиялық аудит, қоршаған ортаны қорғау шаралары, табиғи ресурстар, табиғи ресурстарды пайдаланудың тиімділігі, табиғи ресурстарды пайдаланудың тиімді шарттары, қоршаған орта, табиғи ресурстарды пайдалану тиімділігі аудиті, экологиялық шығындар.

А.О.Жупышева, С.Б.Макыш

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Казахстан*

Проведение государственного экологического аудита на промышленных предприятиях Карагандинской области

Аннотация. Статья посвящена исследованию особенностей проведения государственного экологического аудита на промышленных предприятиях Республики Казахстан, рассмотрен механизм, цели, этапы, основания для проведения данного вида аудита на хозяйствующих субъектах. Здесь также рассматривается деятельность промышленных предприятий и их влияние на окружающую среду. Рассматривается важность организации эффективного контроля и сокращения воздействия промышленных предприятий на окружающую среду и доказана актуальность проблемы нерационального и неэффективного использования природных ресурсов. Показано, что задача ограничения воздействия действующих производств на окружающую среду решается системой экологического аудита и контроля. Дано четкое определение государственного экологического аудита как одного из видов экологического аудита. Он представляет собой независимую, комплексную, документированную оценку воздействия и прогнозирования экологических последствий деятельности хозяйствующих субъектов, установление соответствия вида деятельности требованиям действующего экологического кодекса, а также другим нормативно-правовым актам в области охраны окружающей среды. Рассматривается оценка эффективности природоохранной деятельности, раскрыты формы проведения экологического аудита в предприятиях в Карагандинской области. Вместе с тем в работерассмотрены особенности проведения аудита эффективности использования природных ресурсов, в том числе подробно описаны критерии рациональности и эффективности использования природных ресурсов, применяющихся в мировой практике. В статье также перечисляются показатели государственного экологического аудита, применяющиеся в зарубежной практике.

Ключевые слова: промышленное производство, предприятие, экологический аудит, государственный экологический аудит, природоохранные мероприятия, природные ресурсы, эффективность использования природных ресурсов, критерии эффективности использования природных ресурсов, окружающая среда, аудит эффективности использования природных ресурсов, экологические издержки, экологические риски.

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