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NATIONAL AVIATION UNIVERSITY**

**Faculty of Environmental Safety, Engineering and Technologies**

**DEPARTMENT OF ENVIRONMENTAL SCIENCE**



**LECTURE NOTES**

on the subject «Environmental Audit and Environmental Control»

Educational Professional Program: «Ecology and Environmental Protection»

Field of study: 10 Natural Sciences

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**Environmental audit and environmental control:** a course of lectures on the discipline of the same name. Compiler: Saienko T.V. 77 p.

The summary of the lecture course is prepared for 4th-year students who have studied the disciplines: "Introduction to the profession", "General ecology and neoecology", "Biology", "Biogeochemistry", "Information technologies in ecology", "Monitoring of the natural environment", "Management of environmental protection activities", "Environmental protection legislation", received at the first (bachelor's) level of higher education. and contain information on the basics of environmental audit, control, the history of their development, the current state and prospects for implementation in Ukraine. The environmental management system and the advantages of its application at industrial and economic facilities, international and domestic standards of the ISO, SSTU series are considered. An overview of eco-audit and eco-management management bodies was made, the features of eco-auditor certification were described, and the benefits of implementing eco-audit and control were emphasized. At the end of each lecture, there are self-test questions, exam questions, and a list of recommended reading.

For students of the specialty 101 "Ecology", OPP "Ecology and environmental protection".

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### **General position**

Today, environmental audit is one of the main management mechanisms in the field of environmental protection and nature management. At the same time, an eco-auditor specialist must have extensive knowledge in the field of ecology, environmental law, accounting, audit and control, environmental management and other fields of knowledge. The full training of a highly qualified ecologist-auditor requires at least 50 hours of professional classes (lectures, practical) and the completion of serious industrial practices and internships. The proposed course is designed for 135 hours, including 30 hours. lectures, 30 hours - practical classes, 75 hours - independent work. Environmental audit and control today is an entrepreneurial activity in the field of environmental protection, which requires appropriate in-depth environmental education, sufficient work experience in environmental protection organizations, as well as appropriate confirmation of qualifications - a certificate.

Carrying out an environmental audit of an industrial, energy, agricultural, military or other object requires the auditor (or a group of auditors) deep individual and collective knowledge in various areas: environmental, technical, regulatory, procedural, etc. The main purpose of conducting an eco-audit is to prepare the necessary information about compliance with environmental production norms and rules for managers of enterprises and organizations, help in greening of industries and organizations, promotion of protection and reproduction of the environment.

The reliability of the information is confirmed by verification (performed by an independent licensed organization) and should be used by experts and managers of the enterprise for its greening, reducing the negative impact on the environment.

The term "audit" translates from English as "revision of reporting" and implies elements of internal and external verification. Environmental audit goes beyond the boundaries auditing of reporting, because it involves not only an internal audit of environmental reporting, but also an assessment of the enterprise's impact on the environment, a comparison of the environmental situation related to production with the requirements of environmental legislation, the organization of a systematic review of the potential of environmental risks, the organization of various environmental protection measures within the enterprise taking into account the specifics of the latter, etc.

For Ukraine, the concept of "environmental audit" is new, but it is spreading confidently. This concept is market and promising, it is inseparable from the terms ecological safety, ecological and economic policy, ecological management, investment activity, marketing, competitiveness.

Ukraine is just beginning to realize that eco-auditing is a necessary pre-investment stage of risk assessment by international standards, a mandatory procedure for assessing the value of privatized enterprises to solve the problems of ecological life and ecologically clean products. The market dictates the demand for an environmental audit. Positively certified products after an eco-audit are in greater demand, and their producers, in addition, receive a number of benefits from the state and banks.

The characteristic features of the eco-audit are its independence, confidentiality, objectivity, systematicity, competence, licensure and compliance with the goals determined by the customer when concluding the contract for conducting the eco-audit. All these features are standardized both at the international and at the state level. Features of eco-auditing determine its place in the eco-management system at all infrastructural levels of management and management. Ecological passporting of objects of human activity, territories and processes, despite its very important importance, unfortunately, is not systematically carried out by law in Ukraine. The reason is a low environmental culture and lack of interest of company managers in publicizing their "ecological sins" and paying fines to the state.

Content of the course of lectures  
**"Environmental audit and environmental control"**

**1.1. The history of the development of environmental audit in the world, Europe and Ukraine. Goal, task, definition.**

In international practice, the environmental inventory (revision, review, assessment) has received the name of environmental audit. It has become an integral part, a toolkit of the eco-management system of nature use and management. This is one of the leading market tools for greening not only production, but also socio-economic relations, improving the quality of human life, ensuring his rights to a safe existence.

Ukraine has a number of international obligations and has chosen European guidelines for development. The dissemination of environmental audit should be carried out in accordance with the requirements of international and European standards.

In the developed countries of the world, the concept of "environmental audit" has been known for 30-40 years. In the early 1970s, companies in Western Europe and North America were held legally responsible for the damage they caused to the environment. The significant financial losses associated with this forced them to assess the compliance of their activities with the norms of environmental legislation. According to some features, such an assessment formally corresponded to a financial audit, but, in the end, received the name of an environmental audit.

Environmental auditing has become widespread in industrialized countries: Canada, Great Britain, the Netherlands, the USA, Sweden, and EU countries. In 1984, the US National Environmental Protection Agency developed the concept of environmental auditing for federal agencies. About 40 different federal agencies had developed their own eco-audit programs by 1987.

Environmental auditing has become a separate type of audit activity in the case of acquisition or transfer of real estate and is carried out when concluding all real estate purchase and sale agreements. In addition, the environmental audit plays an important role in the regulation of conflicts between the National Agency for Environmental Protection and companies - violators of environmental legislation. It is mandatory if the cause of the offenses is the absence of an environmental program at the enterprise or its inadequacy to environmental requirements. Specialized environmental audit (investment, energy, product safety assessment, insurance risk assessment, etc.) has become widespread.

In 1990, commercial banks in some industrialized countries began to use environmental audits in order to minimize the risks of loan defaults. In recent years, environmental audit (EA) has been used by international development banks as a management tool to assess the past and current environmental protection activities of companies financed by them. Therefore, EA is transformed from a bureaucratic instrument of control over compliance with environmental laws into an economic and legal mechanism for stimulating environmental protection activities of enterprises.

In Ukraine, since 1995, the Ministry of Environmental Protection and Nuclear Safety (currently the Ministry of Environmental Protection and Natural Resources of Ukraine) and the independent International Foundation followed this path Dnipro, which, with the methodological and financial assistance of the Canadian government, began to introduce an environmental audit. As a result, a complex methodology for carrying out EA and recommended stimulating non-capital-intensive measures to improve environmental characteristics with an economic effect was worked out at various representative enterprises.

So, conceptually, environmental auditing can be classified as environmental and specialized or multi-purpose for the protection of corporate interests, interests of investors, policyholders, creditors, and real estate owners. In its essence, this concept is market and entrepreneurial. It is inseparable from such concepts as competitiveness, ecological entrepreneurship, investment risks. In international practice, this concept has already been implemented and the mechanisms of activity with their legislative, normative-methodical and educational base, organizational infrastructure and qualified eco-auditors are functioning.

The purpose of EA is to comply with the legislation on environmental protection in the process of economic and other activities. The task of EA is to establish compliance of EA objects with the requirements of environmental protection legislation and other criteria of EA. The definition of EA is a documented process of evaluating an object, which includes the collection and evaluation of evidence and establishing the compliance of the object's activity with the requirements of the legislation of Ukraine.

As a result of studying the material of section 1.1, students should get a clear idea of the importance of eco-auditing for the greening of all industries and activities in Ukraine, about the positive experience of the leading countries of the world, about the prospects for the development of eco-auditing in our country.

### **Self-test questions:**

1. What role does EA play in the greening of human activity?
2. What is included in the content of the environmental audit in the economically developed countries of the world?
3. In which countries has the environmental audit become widespread?
4. What are the types of specialized environmental audit?
5. What instrument is environmental audit used by international banks?
6. Since what year was the environmental audit introduced in Ukraine?
7. How can an environmental audit be conceptually classified?
8. Purpose, tasks and definitions of EA in Ukraine.
9. Significance of eco-audit and control in Ukraine.

## **1.2 Legislative and regulatory framework of EA.**

Basic terms and concepts. Despite considerable experience in environmental auditing, currently only environmental audits are officially recognized. This refers to the definition of environmental audit in the Law of Ukraine "On Environmental Audit": "Environmental audit is a documented, systematic, independent process of evaluating the object of environmental audit, which includes the collection and objective evaluation of evidence to establish the compliance of specified types of activities, measures, conditions, environmental management system and information on these issues to the requirements of the legislation of Ukraine on environmental protection and other environmental audit criteria". The DSTU ISO 14010-97 standard also included the transfer of inspection results to the customer and allowed the auditor's participation in the customer's corrective actions through the provision of recommendations arising from the conclusions of the audit report as agreed with the customer.

The closest Ukrainian terminological equivalents of the term "ecological audit" can be considered the following: "ecological survey", "ecological certification", "ecological review". That is, an ecological audit determines the diagnosis of production systems regarding self-cleaning and minimization of environmental pollution, production of ecologically clean products and attractiveness to attract investments. It is for this purpose that Western companies turn to environmental auditors (legal entities or individuals) who can objectively assess the environmental condition of the enterprise, identify existing deviations from norms, that is, from the requirements of current environmental legislation or international standards, and outline measures regarding bringing the enterprise's production activity into compliance with these requirements, and ultimately - to increase the enterprise's rating both on the markets of domestic products and on the investment markets.

When substantiating the objectives and tasks of environmental audit procedures, it is considered as a type of business activity, and the process itself - as an element of environmental management and the organizational-management mechanism of ensuring national security in the environmental sphere, as well as as a tool for ensuring the guarantee of the ecological rights of citizens to technogenic - safe and ecological clean environment. The term "auditing" is taken from the financial lexicon and means checking accounts. Environmental audit is a management tool based on a systemic approach, which is used to evaluate and increase the environmental efficiency of enterprise, industry management with the aim of preserving the environment, maintaining its competitiveness and investment attractiveness due to the ecological cleanliness of production. An environmental audit is conducted to help the authorities identify additional environmental protection measures, study environmental risks and ensure environmental safety; and industrialists - for the rapid implementation of updated means of preventing environmental risks. Objects of environmental audit can be any enterprises, farms, programs, territories, projects, etc.

The main goal of the educational discipline "Environmental audit and environmental control" is a systematic presentation of the features of the introduction of environmental audit from conceptual provisions of national significance to specific standard procedures with practical examples that make it possible to study and implement eco-audit at enterprises, industries, and regions. The discipline provides a holistic view of the system of environmental management and environmental audit and control in accordance with the international standards of the ISO 14000 and ISO 19011 series and, accordingly, Ukrainian DSTU ISO 14000 - 2002 and DSTU ISO 19011-2002.

Environmental audit is based on the principles and methodology of the system approach.

**Ecological safety** is the state of the natural environment, which ensures the possibility of preventing the deterioration of the ecological situation and the occurrence of danger to the health of people and ecosystems.

**Environmental certification** is a process of state environmental accounting of objects of human activity, the implementation of which is ensured by the owners of the objects in accordance with the approved instructions and under the control of a specially authorized person state management body and local state administration. An ecological passport is a state document that records information about the ecological state and impact on the environment of any object of human activity and the history of its "ecological disease".

**Environmental policy (general)** - a system of concepts, principles, approaches, measures that determines the impact of society on the natural environment. Each means of production has its own environmental approaches, which must be consistent with the national environmental policy.

**Environmental goal** - predominant environmental consequences, results that can be achieved within a specified period; the desired environmental limit values that are expected to be achieved.

**Environmental legislation** is a system of legislative and by-laws of Ukraine, which establish the environmental rights and obligations of citizens, the environmental interests of the state and legal entities, the mechanisms of their implementation and protection, regulate relations in the field of use, reproduction and protection of natural resources, determine regimes and territories and objects of special protection and ensure environmental safety requirements in Ukraine.

**Ecological normalization** is the normalization of any anthropogenic impact on ecological systems, for which the reaction of this ecosystem as a whole or any one of its "critical chains" can be determined; this installation permissible limits of changes in the environment without violating the conditions of its self-regulation, self-purification and self-regeneration.

**Environmental management** is a part (subsystem) of the general management system, which harmonizes the activity and development of the enterprise, industry in the surrounding natural environment and in the environmental legal field. Through environmental management, environmentalization of general management functions, planned activities of environmental protection and environmental safety are carried



out; this is internally motivated initiative and effective activity of objects, enterprises, corporations, etc., aimed at achieving their own environmental goals, projects, programs.

**Ecological monitoring** is a complex system of observation, assessment and forecasting of changes in the state of the natural environment due to anthropogenic influence.

**The environmental management system** is an organizational and functional structure that ensures the implementation of the environmental policy of the enterprise, industry. The environmental management system covers planning activities, duties, responsibilities, experience, methods, techniques, processes and resources for the formation, implementation, analysis and improvement of environmental policy.

**Environmental management standards** - generally accepted and appropriately approved documents with the application of effective standard processes and procedures of environmental management (preservation, reproduction and rational use of natural resources).

**Environmental requirements** - mandatory requirements specified in legislative or by-laws, which are aimed at ensuring rational nature management, environmental protection and environmental safety.

**Environmental management and audit system (EMAS)** - according to the definition of international standards ISO 14000, it is part of the overall management system, which includes the organizational structure, planning activities, functional duties and responsibilities, experience, methods, procedures and resources for the formation, implementation and improvement of environmental policy with the use of environmental audit. SEMA is a system-forming element of the market environment in the field of nature protection and nature management.

**Environmental certification system (ECS)** is a mandatory state, voluntary or international system that has its own rules, procedures and management for carrying out environmental certification and making a decision on issuing a certificate and is formed in accordance with the state or international environmental policy, taking into account the general rules of certification in the country.

**Environmental standardization** is a system of mandatory norms, requirements, rules, and regulations regarding environmental protection, nature management, and environmental safety.

**The environmental insurance system** is a mandatory or voluntary system of environmental risk or property insurance against environmental disasters, which has its own legal basis, standards, rules, procedures and management for carrying out environmental insurance activities in accordance with state or international environmental policy. Environmental insurance provides for the liability of the policyholder (insurance company) for risks associated with excessive pollution of the natural environment.

**The ecological market** is a component of the general market environment of the state environmental policy, which is characterized by a competitive exchange of everything aimed at preserving, reproducing and rationally using the natural

environment, improving people's lives and ensuring environmental safety. The ecological market is a market of ecological technologies, works, goods, services, knowledge, ecological information.

**Environmental modernization of production** is the development and implementation of a complex of managerial, technological, investment and economic measures that improve the ecological characteristics of the structural elements of the production system.

**Greening of production** - processes of reducing the integral environmental load on natural objects and ecosystems per unit of production.

**Ecological ("green") technologies** — technologies that ensure ecological modernization and greening of production in general, the production of ecologically clean products.

**Ecological benefit (eco-profit)** is a benefit balanced in favor of man and nature, obtained by reducing the harmful impact on the environment, increasing the efficiency of nature use, and reducing environmental costs. This is the profit from the sale of environmentally friendly products, the provision of environmental services, and the performance of environmental works.

**An environmentally friendly product** is a product of the highest consumer quality and competitiveness, which meets quality standards and environmental requirements, is duly certified with the provision of an accepted appropriate environmental mark.

**Environmental subsidies** are investment subsidies that cover part of the expenses for the development of new technologies and loans for environmental protection equipment, for restoring the quality of the environment, or subsidies for the payment of interest to cover loans.

**Payments for environmental pollution** - payments established in accordance with the fee regulations for: emissions of polluting substances into the atmosphere; discharges of polluting substances into surface waters, territorial and internal sea waters, as well as underground horizons, including discharges carried out by enterprises through the communal sewage system; payments for waste placement.

**Recovery** is the return of a part of the material and or energy for their repeated use in the same technological process: capture or separation of valuable solvents from used mixtures, use of waste gaseous products of fuel combustion for heating air, gas or water in technological installations, return of electrical energy to power supply during braking of the electric machine, etc.

### **Self-test questions:**

1. What are the closest terminological meanings of environmental audit?
2. Define environmental audit?
3. Is eco-audit a type of business activity?
4. When did the Law of Ukraine "On Environmental Audit" come into effect?
5. What international and domestic standards of the environmental management system do you know?

### **1.3 SEMA - environmental management system and audit and its effectiveness.**

An important step in the development of environmental audit was the adoption of international standards ISO series 14000 on 01.01.1998 at the level of state standards, which regulate the methodological bases of audits of environmental activities of enterprises. Today, relations in the field of environmental audit are also regulated by the Laws of Ukraine "On Environmental Audit", "On Protection of the Natural Environment", National Standards of Ukraine DSTU ISO 19011:2003 "Guidelines for Audits of Quality Management Systems and (or) Environmental Management", DSTU ISO 14001:1997, DSTU ISO14004:1997 "Environmental management system", ISO 14015:2005 "Environmental assessment of production facilities and organizations". It was planned that the application of ISO 14000 standards would enable Ukrainian enterprises to ensure their own competitiveness on the domestic and foreign markets. The basis for the introduction of EA, the adoption of the Law of Ukraine "On Environmental Audit" and its further development was the ratification at the state level of international standards of environmental management and auditing of the ISO 14000 series.

The DSTU ISO 14001 standard establishes requirements for the environmental management system. It can be used in organizations of all types and scales of activity, taking into account geographical, cultural and social differences. The model of the environmental management system can be presented as follows: 1. Environmental policy. 2. Planning. 3. Management and functioning. 4. Control and adjustment. 5. Management analysis. 6. CONTINUOUS IMPROVEMENT.

**The main purpose of using this standard** is to ensure environmental protection and prevent its pollution, consistent with socio-economic needs. It should be noted that many requirements of the standard may be adopted simultaneously or revised over a period of time.

**Environmental management covers** the entire complex of problems, including those related to the overall strategy of the organization and competitiveness. An organization can use evidence of successful implementation of the DSTU ISO 14001 standard in order to convince interested parties of the existence of an adequate environmental management system.

**This standard contains** only those requirements for the purposes of certification or registration or self-declaration that can be objectively verified. Those organizations that need more general guidance on a wide range of environmental management system issues should refer to DSTU ISO 14004 "Environmental management systems. General guidance on management principles, systems and means of support".

**It should be noted that the DSTU ISO 14001** standard does not establish specific requirements for environmental characteristics, except for the obligation to comply with current legislation and regulations, as well as the obligation for continuous improvement. So that two organizations that carry out similar activities, but have different environmental characteristics, can both meet its requirements.

**Systematic implementation** of a set of environmental management methods can provide optimal results for all stakeholders. However, the use of the DSTU ISO 14001 standard in itself does not guarantee optimal results regarding environmental protection. To achieve environmental goals, an environmental management system should encourage organizations to adopt the best available technologies where possible and economically feasible. It should be added that the economic efficiency of such technologies should be fully taken into account.

**The DSTU ISO 14001 standard does not apply** to and does not contain requirements for aspects of health care, safety management. Thus, the process of certification or registration in accordance with the requirements of this standard concerns only the environmental management system.

**The DSTU ISO 14001 standard contains** the same general management system principles as the DSTU ISO 9000 series quality system standards. Therefore, organizations can apply a management system that meets and does not conflict with the standards of DSTU ISO 9000 series as a basis for their environmental management system. However, it should be understood that the application of elements of the management system may differ due to different goals and different circles of stakeholders. While quality systems deal primarily with needs.

### **Self-test questions:**

1. The implementation of which model of the environmental management system is provided by the state standard of Ukraine DSTU 14001 - 97 and new versions?
2. What are the principles of forming the organization's environmental policy?
3. What requirements are set forth in the state standard of Ukraine DSTU 14001 - 97 and in the new versions for the "planning" block?
4. What requirements are set forth in the state standard of Ukraine DSTU 14001-97 and in the new versions for the "implementation and functioning" block?
5. What requirements are set forth in the state standard of Ukraine DSTU 14001-97 and in the new versions for the block "control and corrective actions"?
6. What requirements are set forth in the state standard of Ukraine DSTU 14001-97 and in the new versions for the "management analysis" block?

#### **1.4. Purpose and tasks of environmental certification territories and enterprises.**

Ecological certification was introduced with the aim of improving the ecological situation. According to State Standard 17.0.0.04-90 "Environmental passport of an industrial enterprise", the purpose of environmental certification is: - Establishing quantitative and qualitative characteristics of nature (raw materials, fuel, energy), as well as quantitative and qualitative characteristics of emissions of environmental pollution, effluents, waste, radiation ;

- Establishing specific indicators of pollution and the state of the company's environmental management, its analysis of technologies and equipment in comparison with the best domestic and foreign samples, as well as information about the company's losses.

As a result of the environmental certification of companies, the impact of emissions, environmental waste pollution and their impact on the health of the population are taken into account, as well as the payment for environmental pollution is determined. The ecological passport allows to coordinate the activities of the enterprise with local departments of health and nature protection (protection of air, water, land resources, flora and fauna). The passport is approved by the head of the company, who is responsible for its authenticity and the data contained in it. Passporting is carried out periodically in the event of any changes in technology, during the reconstruction of enterprises, and during the development and production of new products.

**The structure and content of the environmental passport.** Title page, general information about the company and its features; brief climatic characteristics of the company's area, description of production technology, information on products, material flows, material balance sheet, information on the use of materials and energy resources, emissions, water consumption and maintenance, waste, information on reclamation, transport companies, environmental and economic efficiency of work companies

The development of an ecological passport consists of the following stages: appointment of a working group and issuance of a plan for drawing up an ecological passport; distribution of functions between executors and units of its implementation; collection of normative and technical documents of the enterprise; quantitative and qualitative analysis of material flows, sources of environmental pollution; reduction of production waste; establishment of MPC. MPE, MPD on waste substances; inventory of water, waste water. Inventory of natural resources and quantitative assessment of raw materials, energy resources per production unit; accounting and quantification of waste by types of products and their quantity per unit of production; inventory of used land resources and buildings.

In the form for filling out the ecological passport, schemes of sources of air pollution, surface water, waste stocks, limits of sanitary zones, highways, recreation areas, MPC of air pollution and MPC of wastewater pollutants are also indicated; meteorological characteristics and dispersion coefficients of polluting substances in

the atmosphere of the city (the stratification coefficient of substances in the atmosphere, local ambient temperature, wind direction, wind speed); local features of environmental protection, background concentrations of pollutants, etc.

### **Self-test questions:**

1. What is the purpose of environmental certification of enterprises?
2. What are the tasks of environmental certification of enterprises, territories, water areas?
3. Frequency of the object certification process?
4. What production indicators are indicated in the ecological passport?
5. Are ecological passports drawn up for nature conservation objects?
6. Is environmental certification carried out now and is it necessary? is she today

### **1.5. Conceptual provisions on the introduction of environmental audit in Ukraine**

The state management system performs four main target functions: implementation of environmental legislation, environmental control and nuclear safety, ensuring environmental protection, achieving coordination of activities of state and public bodies in emergency situations.

The most important of them are the first two functions - **implementation of environmental control**. In accordance with these functions, an appropriate institutional infrastructure has been created, which also includes environmental examination bodies and environmental inspections, which are smaller in terms of functions and coordination, but represent the base of the management pyramid. We can say that the strength of the foundations can be provided primarily by the environment, which is considered as an effective ecological harmonization of the actions of state and public and local authorities and enterprises.

**Triad Environmental management - Environmental assessment - ecological survey of the environment** - create a reliable basis for the environmental management system at all levels - from government to business.

The legislative and regulatory work of the legislative and executive authorities of Ukraine has achieved considerable success in the development of legislative and regulatory frameworks for the introduction of environmental audit as a type of activity of mainly entrepreneurial orientation, namely:

- environmental audit is recognized in Ukraine as one of the priorities of state policy in the field of environmental safety. According to the relevant decision of the Verkhovna Rada of Ukraine, the implementation of the environmental audit legislation is entrusted to the government.

Goals for the development of the state of the natural environment have been defined and changes have been made to the current environmental legislation

regarding the introduction of environmental audit and control at the industry level. The State Standard of Ukraine approved and put into effect, as an official publication, the collection of standards ISO 14001 - 97, 14004 - 97 (Management systems); ISO 14010 -97, ISO 14011 - 97, ISO 14012 - 97 (Guidelines for implementing environmental audits) in accordance with ISO 14000.

Ecological audit is included in the list of priority measures of the old concept of Ukraine, the national program of ecological improvement of the Dnipro basin and other national programs. We will especially note the level of legislative and legal acts on environmental audit compared to other organizational and legal acts: Environmental impact assessment, On the work of the environmental inspection, waste certification are, above all, mandatory functions of environmental regulation in environment, while the environmental audit is also a management tool that can be used both mandatory and voluntary.

The peculiarity of state legislative acts is their application to establish compliance (ecological assessment of the impact on the natural environment) or other activities with legislative requirements, definitions and environmental restrictions of object operation, state accounting and certification.

The field of application of legislative acts is much wider. It covers not only environmental, but also investment, privatization, insurance, resource, banking, and marketing activities. This is especially true in the first place in market conditions or when there is a change of ownership. We emphasize that the legal significance of the results obtained when using public tools and the legal significance of the results of an independent environmental audit are fundamentally different.

The main task of the environmental audit as a legislative and management tool is not only the assessment of the enterprise's compliance with the requirements of environmental safety and environmental protection in the event of emergency situations, but also the formation of information (recommendations) that allows the person who makes a decision based on the conclusion of the audit groups, answer the questions: - does the company's activity comply with national environmental legislation and what damage does it cause to the environment and the population (since it is a source of pollution and dangers)? - is the enterprise equipped with means of protecting people in the event of a dangerous situation (including natural and industrial and economic objects, social infrastructure) against threats of the object's activity as a source of man-made hazards? Or, is it possible for the audited enterprise to be polluted by environmental objects (if there are polluted natural objects or other sources of pollution near the plant, and to what extent they are a source of environmental danger for it)? On the other hand, is there protection of the enterprise against the threat of contaminated natural objects (or is the environmental security of the audited enterprise ensured)? Does the value of real estate investment correspond to the level of environmental risk? That is, is the investment amount of real environmental costs included in the product price?

Answers to these and other questions will allow owners, investors, shareholders and the public to impartially assess the current state of enterprise security.

**The man-made concept** does not have a developed theoretical base and represents the spread of the experience of man-made activities for the future.

**The biosphere concept** is distinguished by an attempt at theoretical substantiation and understanding of the concept of ecological imperative. It answers the question - how to ensure the sustainability of life. Stability means the ability of biota to compensate for external disturbances, to return the environment to a state of stable, dynamic equilibrium. The influence of biota, compensating for anthropogenic disturbance, is possible up to a certain level. The main direction of the concept is to establish the limit of stability and stability of any ecosystem, which will allow finding the acceptable amount of disturbance - the load on the ecosystem.

As a base, the biosphere concept of development should be chosen, which includes environmental protection activities that arise from the man-made concept, as a special case, covering local tasks based on the creation of cleaning systems, resource-saving technologies, and the regulation of environmental pollution. The following main strategic tasks are formulated in this concept:

preservation of the territory undisturbed by economic activity with a preserved amount of natural biota, which should become a center for the restoration of the natural environment and biota; local cleaning of the environment in places of increased ecological danger on the basis of environmental quality regulation, introduction of the cleaning system and resource-saving technologies.

**The main strategies of environmental safety are as follows:** prohibition of activities that increase environmental hazards; the obligation of compensation in case of involvement in economic use of new areas of the territory; increasing environmentally safe technologies; loss prevention; compliance of any economic activity and related nature protection measures, authorities, nature users, the public and citizens with the strategic tasks of environmental security; obligation to assess the impact on the natural environment; declaration - a mandatory warning of danger to citizens and authorities about certain actions, technologies that can lead to violations of the state of the environment and deterioration of people's health; registration of new substances, especially hazardous substances, biotechnologies, etc.

Based on the results of the analysis of the legal framework on safety, taking into account the experience of practical activities in the regions to ensure environmental safety, the following definition of environmental safety can be given.

**Environmental safety of the individual, society and the state** is a state of protection of the vital interests of the individual, society and the state in the process of interaction between society and nature from threats: from natural objects whose natural properties have been changed by pollution, clogging as a result of: anthropogenic activity ( in the event of accidents, disasters, long-term economic, defense, military and other activities); intentionally (through environmental sabotage, environmental aggression); natural phenomena and natural disasters with ecological consequences; insecurity of natural resources caused by the destruction, damage, depletion of natural objects or export of natural resources outside the country.

### **Self-test questions:**



1. Outline the system of public administration in Ukraine and its functions.
2. What is the triad of state environmental management?
3. What is the peculiarity of state environmental legislation?
4. Describe man-made and biosphere Concepts of environmental protection?
5. What environmental safety strategies do you know?

### **1.6. Types of environmental audit in Ukraine and environmental safety of enterprises.**

**Privatization audit.** It ensures the health of its participants and the state as a whole. The policy of this audit is related to investments for the restoration and development of production potential. The privatization process is fully controlled by the State Property Fund of Ukraine.

An environmental audit in the process of privatization can be carried out in two ways:

- 1) According to the direction of environmental audit;
- 2) Determination of environmental safety of the facility.

The ecological value of the territory is determined by the set of functions of restoration of natural resources and assimilation of polluted substances or other consequences of anthropogenic influence. The degree of environmental safety of privatized enterprises depends on the actual degree of harmful impact on the environment. A comprehensive audit of production should be carried out for ecological and economic assessment. This can be done by a special company. The property fund assumed a temporary function when the EA itself was carried out to simplify the audit procedure. According to this function:

The State Property Fund of Ukraine carries out a quick assessment of enterprises subject to privatization. For evaluation, the commission is headed by a representative of the Ministry of Environmental Protection and Natural Resources of Ukraine. If the operational commission has identified potential damage to the environment, the result of the commission is recorded in the protocol.

Objects are divided into the following groups:

- 1) Enterprises that will be liquidated within the specified period for environmental reasons;
- 2) Enterprises that increase environmental hazards and are designated for relocation outside cities for environmental reasons;
- 3) Enterprises that have sources with increased environmental danger and are subject to removal in case of taking measures to reduce environmental danger and allocation of privileges for privatization;
- 4) Enterprises that are subject to privatization and do not create conditions of ecological danger.

The reasons for assigning companies to one or another group are:

- adoption in the established order by state and local authorities of decisions on closing (conservation), reconstruction and renewal of enterprises of the district for technical and industrial, social and environmental reasons;

- Materials of the Ministry of Nature of Ukraine, public health supervision and the prosecutor's office on the state of nature protection objects;

- limits on the use of privatization revenues for environmental needs are set for the region.

In the list of companies that are privatized on the conditions of their environmental rehabilitation, and the new owners of the latter regarding the benefits of privatization, included in the most environmentally dangerous enterprises of the region with the total cost of environmental items on the balance sheet of these companies and the limits established for their areas, limit the use of privatization revenues for environmental needs. The list of companies included in the first group is agreed with the Cabinet of Ministers of Ukraine, the second group - with the State Property Fund of Ukraine.

After the express assessment is completed, EA is conducted in accordance with the "Temporary Regulation on the Environmental and Economic Assessment of Companies that are Sources of High Environmental Hazards".

The sequence of conducting an expert assessment of groups of enterprises selected for a phased rapid assessment is as follows:

- a group of companies that are sources of high environmental danger: determine the priority measures for improving the environment, included in the conditions or in the privatization plan, determining the financial resources and obligations of the new owners of enterprises and state authorities;

- a group of enterprises that are subject to liquidation or are included in the conclusion regarding border towns with environmental problems: development of measures to close or relocate enterprises, taking into account the need to restore the ecological state of the territory;

- determination of financial resources and obligations of new owners (with resettlement, arrangement), state authorities.

Generalization of examination results can be determined for each enterprise for the purpose of ecological rehabilitation and development of a list of environmental protection measures.

These measures are included in the tender conditions (or privatization plan) and estimates of environmental costs and are subject to compensation from the fund of ecological rehabilitation enterprises. A special fund has been created for the implementation of the environmental improvement program.

Funds are kept in a sub-account or a special account of the regional environmental fund. State expertise is more involved in the investment process, but its features are limited legislative provisions that define the limits of conclusions or assess deviations from the requirements of environmental legislation and regulations.

**Investment environmental audit** is distinguished by its features and other procedures. It is used mainly at the stage of investment, complex investment programs and projects, this environmental audit can be compared to a financial audit.

**Energy environmental audit.** One of the types of used audit of the technical sector is carried out by the Ministry of Energy. The main purpose of the audit is to reduce energy consumption while maintaining production volumes and reducing the impact on the environment.

**The energy audit provides:** 1) true information about the use of energy resources, the main losses and their causes;

2) Qualified recommendations on specific actions that will reduce energy consumption by up to 75%;

3) Information about energy-efficient equipment.

Eco-audit in the process of privatization can be carried out in two directions. **The first is related** to the determination of the ecological state of the area where the object of privatization is located (**eco-audit of the area**). **The second is due** to the definition of environmental safety of the object itself (**eco-audit of the enterprise**). The ecological value of the area is a set of functions aimed at the reproduction of natural resources and the assimilation of pollutants, or other consequences of technogenic influence. The environmental safety factor of the enterprise itself, which is being privatized, is related to the actual scale of the enterprise's cumulative harmful impact on the environment. To assess such cumulative impact, it is necessary to conduct **a comprehensive environmental audit of production areas**, waste processes, and eco-management systems. This can be done only by specialized environmental audit and engineering firms with highly qualified personnel and firms that have the appropriate licenses.

In the investment process, the state environmental expertise is more involved. But its functions are limited by legislative provisions within the scope of conclusions that determine, establish or evaluate deviations from the requirements or norms of environmental protection legislation. These are mainly the functions of permission for the implementation of investment programs, projects and economic decisions.

Other functions of an environmental audit. They are not only evaluative, but also recommendatory. That is, the eco-audit not only provides conclusions about possible negative effects on the environment, the state of environmental safety, but also assesses the degree of risk, presents qualified recommendations regarding measures that must be taken into account during design or construction, and evaluates their cost.

Thus, **the eco-audit is distinguished by its complexity with the implementation of research and engineering procedures.** It is used to a large extent at the pre-investment stage. It can also be used when developing restructuring programs for auditing enterprises that are decommissioned. For complex investment programs and projects, an environmental audit may precede an environmental examination. This can be compared to the financial audit that large firms conduct before the tax inspectorate audits their financial activities.

Recently, in the process of reforming the economy of Ukraine, there are active trends of taking into account environmental priorities. The ecologically dangerous economy of Ukraine is beginning to take the first steps in the direction of ecologically balanced development. This process is difficult and long-term, because it

is connected with the transformation of man-made economic thinking into a social-ecological one. Therefore, the formation of an environmental policy, an environmental management system at the level of each owner, enterprise, corporation, industry, region, etc., is relevant and necessary at the current stage. All this is impossible without the formation of organizational and economic foundations and the implementation of the environmental audit procedure, which is provided for in the leading relevant international and Ukrainian standards.

So, let's highlight two main directions of implementation of the strategy of further reforming the mechanism of regulation of environmental safety of Ukraine. And they consist of the following:

- firstly, it is the introduction of new mechanisms and tools that could provide a preventive system of actions and measures to reduce environmental risk;

- secondly, it is the harmonization of the regulatory and methodological framework of environmental safety regulation in Ukraine with European standards.

Therefore, the most important direction of the state environmental policy is institutional transformation with the aim of forming a new legal and economic mechanism for regulating the interaction of state bodies at various levels and nature users, introducing environmental requirements into the procedure for assessing the socio-economic efficiency of adopted management decisions.

In our opinion, the composition of these transformations should include actions:

- improvement of environmental protection legislation, the system of environmental restrictions and regulation of nature use regimes with the aim of their adaptation to the conditions of liberalization and further rational denationalization of property;

- gradual transition to international standards of technological processes and manufactured products, which creates the necessary conditions for the inclusion of Ukraine in the world economy and the international system of ensuring environmental safety;

- economic stimulation through the means of state tax, credit and price policy of resource and energy saving, introduction of ecological equipment and technology;

- ensuring the implementation of environmental management systems and impact assessment at different hierarchical levels of management;

- formation of the market for environmental works and services, development of environmental auditing and entrepreneurship in this area.

Let us emphasize that the result of these transformations should lay the foundation for the stabilization and further improvement of the ecological situation in Ukraine.

The environmental audit must be complete and permanent, i.e. give a full assessment of how the requirements regarding the state of the environment are met by the registered entity. It goes without saying that the environmental audit should be conducted by independent experts.

**We believe that the main reasons for which an audit should be conducted are as follows:**

- insurance (expenses for eliminating the consequences of environmental pollution);
- competition on the market (goods must be ecologically clean, which increases the demand for them on the consumer market, goods that have passed inspection are marked with a special label, etc.);
- acquisition (expenses for the acquisition of a land plot or enterprise may turn out to be excessive; examination of the state of the environment and pollution of land plots of the object planned for acquisition);
- legislation (the need for a permit for work with polluting materials).

Comprehensive control should timely reveal the quality of economic and environmental management decisions even before losses occur, since excess production costs (including due to environmental pollution) or the release of environmentally hazardous products lead to the loss of sales markets.

Today, environmental audit has become an integral part, a toolkit of eco-management systems from the macro- to the micro-level of nature use and management. This is one of the leading market tools for greening not only production, but also socio-economic relations as a whole, improving the quality of human life, ensuring his rights to an ecologically safe existence.

The State Standard of Ukraine approved and put into effect as an official edition the collection of standards DSTU ISO 14001-97, 14004-97 (Environmental management systems) and DSTU ISO 14010-97, 14011-97, 14012-97 (Guidelines for conducting environmental audits) in accordance with international standards ISO series 14000.

Environmental audit is included in the list of priority measures of the Concept of Sustainable Development of Ukraine. The relevance of environmental audit is that today Ukraine is beginning to realize that eco-audit is a necessary pre-investment stage of risk assessment according to international standards, a mandatory procedure for determining the value of privatized enterprises, marketing research of product competitiveness, an effective tool for reconciling national and local interests environmental safety.

The main goal of the implementation of the Law "On Environmental Audit" is (Article 8) "to ensure compliance with the legislation on environmental protection in the process of economic and other activities."

But **this goal can be achieved only if the environmental audit will be mandatory for all enterprises and organizations** whose activities lead or may lead to harmful effects on the natural environment, and will be carried out with a certain frequency, perhaps once a year three years. Only then will the environmental audit become a mechanism that can actually lead to an improvement of the environmental situation in Ukraine.

Unfortunately, the same Law itself limits its own effectiveness and does not allow to achieve the main goal of the audit, established by it itself. Yes, Art. 12 limits the range of enterprises on which a mandatory environmental audit must be carried out, only to enterprises that are in a state of bankruptcy, privatization, transfer to lease, environmental insurance and in other cases. The vast majority of enterprises

that cause the greatest damage to the natural environment have long been privatized. These are enterprises of the mining, metallurgical, chemical and energy industries. They account for more than 90% of emissions into the atmosphere, emissions of polluted sewage and toxic waste. They work successfully and increase production volumes every year, and their owners receive high profits. The paradox is that they are not interested in the introduction of environmentally friendly technologies, the construction of highly efficient treatment facilities.

It is economically more profitable for business owners to pay for environmental pollution and disposal of waste than to comply with all standards of environmental protection legislation. It is possible to carry out an environmental audit at these enterprises (or some of the main polluters of the environment in Ukraine) only on a voluntary basis, with the consent of the heads of the enterprises (Article 12), even if the audit clients are local self-government bodies. If the enterprise agrees to conduct a voluntary internal environmental audit, then in this case too, Art. 8 limits the audit procedure, since "the specific tasks of the environmental audit in each case are determined by the customer, based on his needs." That is, the first place is not the interests of the state, but the interests of the customer. And the customer of the audit can be the owners of enterprises or their managers and other organizations, not only state bodies. Thus, they determine the scope of the audit, which makes the environmental audit incomplete and limited.

In turn, the practical experience of conducting environmental audits at metallurgical and other industrial enterprises of Ukraine by domestic specialists (for example, at enterprises such as Vostok-ruda OJSC, Zaporozhstal OJSC, KGMK Kryvorozstal OJSC, etc.) proved that when conducting a deep and comprehensive environmental audit at any enterprise reveals dozens of non-conformities with the environmental legislation of Ukraine. As a rule, the audit team, together with the company's specialists, is always able to find ways to eliminate these inconsistencies, often looking for non-standard, but sufficiently effective solutions.

Unfortunately, the conclusions of the environmental audit have the nature of recommendations and are not binding for the company's management. The experience of environmental audit proves that its effectiveness depends on three main factors:

- the depth of interest of the company's management and owners in conducting the audit;
- complete openness and conscientiousness of the company's specialists in the analysis of all environmental aspects;
- joint, coordinated work of the audit team and company specialists.

After the adoption of the Law of Ukraine "On Environmental Audit", changes were made to the Law of Ukraine "On Privatization". According to both of these laws, a mandatory environmental audit must be conducted before privatization, leasing, concession, insurance, etc. The conclusions of the environmental audit must be included in the conditions of privatization, lease, concession.

However, in some cases, the state property authorities fix in the conditions of privatization an environmental audit after privatization. That is, there is a certain

inconsistency in the execution of the general procedure, which to a large extent deprives one of the main ideas of the Law "On Environmental Audit" - to oblige the conditions of privatization to implement environmental protection measures and eliminate inconsistencies with environmental legislation, which were established in the process of environmental audit.

Therefore, it **can be concluded** that today there is an urgent need to improve the Law "On Environmental Audit", a number of additions and changes made to it. In particular, we believe that it is necessary and expedient to ensure the obligation to carry out an environmental audit at all enterprises that pose an environmental hazard, regardless of their forms of ownership; legislate the mandatory implementation of environmental audit recommendations. It is also necessary to expand the scope of environmental audit to include objects that are already outside the scope of production activities, but continue to pose a threat to the environment - old oil storage facilities, accumulators of toxic waste (including pesticides and mineral fertilizers), etc. It is necessary as soon as possible to develop and adopt a unified methodological basis for conducting audits, unified requirements for auditors, unified conditions for the investigated object, and to work out other complex issues of environmental auditing. The integration of the methodological base of environmental audit within the framework of building ISO 14000 systems and environmental audit procedures within the framework of the Law "On Environmental Audit" is quite promising. For this, it is necessary to create a single scientific and methodological center of environmental audit. The main functions of such a center could be the analysis and generalization of the results of environmental audit procedures, improvement of methodological, regulatory and legislative bases of environmental audit. Such a strategy for the development of environmental audit would make it one of the real mechanisms for improving the unfavorable environmental situation in Ukraine.

It should be noted that at the current stage of the implementation of environmental audit in Ukraine, the following should be spread:

- express assessment of environmental safety of enterprises being privatized (privatization eco-audit);
- complex express assessment of enterprises with the aim of carrying out non-capital-intensive measures regarding ecological modernization of production;
- environmental audit of investment proposals as part of sectoral production restructuring programs (investment audit);
- audit of estimated payments for the use of natural resources;
- audit of the rationality and safety of the use of energy resources (energy audit);
- an in-depth environmental audit as part of sectoral programs of structural restructuring and solving environmental problems.

Also, promising directions for the development of environmental audit are its use in the **system of environmental insurance** in the preparation of contracts eco-insurance, development of plans for preventive measures **to reduce environmental risks**, when assessing damage from the occurrence of an insured event for entrepreneurs in connection with environmental pollution; **in the pricing system; in**

the **formation of funds for environmental rehabilitation of enterprises**; in the **environmental certification system**; as part of the general audit of accounting documentation, etc.

### **Self-test questions:**

1. Purpose and tasks of privatization audit.
2. Features of energy and investment audits.
3. Purpose and tasks of a comprehensive audit.
4. The essence of environmental security of the enterprise.
5. The essence of environmental insurance.
6. State the reasons for applying an environmental audit.
7. In your opinion, does the Law "On Environmental Audit" fulfill its function?

### **1.7. Methodological foundations and principles of environmental audit.**

According to Art. 16 of the Law of Ukraine "On Environmental Audit", the executor of the environmental audit has the right to independently determine the forms and methods of the environmental audit. In addition, conducting an environmental audit at objects belonging to different branches of production may have its own specific features, therefore the given methodological recommendations are of a recommendatory nature and can be used by both customers and environmental audit performers when ordering, during preparation and implementation environmental audit and when drawing up an environmental audit report.

Environmental audit clients may be interested in central and local executive authorities, local self-government bodies, other legal entities, as well as natural persons (hereinafter referred to as the Client). The client of the audit may enter into an environmental audit agreement with both legal and natural persons certified to carry out an environmental audit in accordance with the requirements of the Law of Ukraine "On Environmental Audit" (hereinafter referred to as the Executor). Relations in the field of environmental audit in Ukraine are regulated by the Law of Ukraine "On Environmental Audit", the Law of Ukraine "On Environmental Protection", other acts of Ukrainian legislation, state standards of Ukraine. Environmental audits at military, defense and other facilities, information about which constitutes a state secret, are conducted in accordance with the Law of Ukraine "On Environmental Audit" taking into account other legislative acts.

**The performer of the environmental audit must:** - together with the Customer determine the possibilities of conducting the audit, in particular, agree on the terms of the audit, the cost of the work, access to objects and information, compliance with safety techniques during the implementation of the environmental audit, confidentiality issues, etc.; - send an information request to the Audit Customer to form an environmental audit task; - together with the Customer, determine and agree on the scope of the audit, form, purpose and tasks, audit criteria (if necessary,



specify the tasks of the environmental audit, based on the needs of the Customer and the nature of the activity of the object of environmental audit); - on the basis of the task received, prepare and conclude an environmental audit agreement with the Customer; - if necessary, identify a specialized organization that will carry out field (laboratory) research and conclude a corresponding contract with it; - to appoint the head of the environmental audit team, if the Executor of the environmental audit is a legal entity.

**The head of the environmental audit group must:** - establish preliminary contact with the audit object; - prepare a list of additional questionnaire questions, taking into account the specifics of the activity of the audit object; - during the environmental audit of the environmental management system, the questions of the questionnaire are formulated on the basis of the relevant standards: DSTU ISO14001-97 and DSTU ISO 14004-97; - prepare an environmental audit plan; - determine:

1. Composition of the environmental audit group;
2. Availability of other competent auditors and experts who can be involved in the audit if necessary;
3. Tasks for members of the environmental audit group;
4. Audit methods;
5. Financial resources necessary for the preparation and implementation of an environmental audit;
6. Time for travel, accommodation and other stipulated needs of auditors; - prepare working documents necessary for recording information during the audit; - agree with the Customer on the approximate scope of the report and the number of attachments; - to analyze the source information regarding the environmental audit object (facts about previous activities on the territory of the audit object, geographical and geological data, maps, space photographs, etc.).

**The head of the environmental audit group needs** to hold a meeting with the management of the audit object or a specially authorized person appointed by the management of the audit object for cooperation during the environmental audit. Employees of the audit object, responsible for activities or processes subject to environmental audit, and representatives of the Customer are invited to the meeting, if necessary. Key issues discussed and agreed upon during the introductory meeting should be properly documented.

**Examination of the object.** The environmental auditor conducts an on-site survey of the object (the area where the object is located, production premises and other buildings) in order to collect and objectively evaluate evidence to establish the compliance of the specified types of activities, measures, conditions, the environmental management system and information from these questions to the environmental audit criteria. For this purpose, the environmental auditor must: - identify visible (external) manifestations of pollution of the natural environment (soil, surface water, vegetation) and probable sources of pollution; - in order to determine the sources of pollution and responsibility for the impact on the surrounding natural environment, establish the functional purpose (use) of adjacent territories, neighboring objects and objects located on the territory of the audit object, but

belonging to other owners; - examine the condition and functioning of the infrastructure (sewerage, water pipes, storm sewer systems, heating lines, etc.); - check the condition of environmental protection equipment and structures, in particular, the time of installation, depreciation, suitability for further operation; - check the storage conditions of raw materials and products, in particular, dangerous substances; - inspect places (objects) of waste management; - fill in the table - Results of the inspection of the audit object.

**This stage (survey of the object)**, which is not mandatory, but may be provided for in the environmental audit plan. In accordance with the concluded contract with a specialized organization, conduct field (laboratory) research with sampling in the prescribed manner. The report on the results of field (laboratory) research should be added to the environmental audit report.

On the basis of the materials and evidence obtained during the environmental audit, it is necessary to draw up **a report on the environmental audit** with a conclusion on the detected inconsistencies of the environmental characteristics of the object of the environmental audit with the requirements of legislative and regulatory acts, which is certified by the signature and seal of the environmental auditor. If necessary, provide recommendations on the measures to be taken to eliminate inconsistencies identified during the audit, and include them in the environmental audit report.

### **Self-test questions:**

1. Describe the Customer, the Executor and the relationship in the field of environmental audit.
2. Describe the stage of Preparation for environmental audit.
3. What is the process of conducting an environmental audit at the object?
4. Describe the process of surveying the facility and preparing an environmental audit report.
5. What are environmental audit criteria and evidence?
6. Should the auditor (or a group of auditors) provide recommendations on measures to be taken to eliminate the environmental audit findings?
7. What are the principles of eco-audit prescribed in the Law of Ukraine "On Environmental Audit"?

### **1.8. Environmental audit activity.**

In Article 4 of the Law of Ukraine "On Environmental Audit", environmental audit activity includes conducting an environmental audit, as well as its organizational, legal, methodical, advisory and other types of support. For a typical environmental audit process in accordance with international standards and its successful implementation and obtaining useful results, the following requirements should be observed:

- the subject of the eco-audit and the participants responsible for it must be clearly defined and documented; - conducting an eco-audit should be supported by the company's top management, ready to respond adequately to all deficiencies identified during the audit; - it is necessary to have reliable and sufficient information on the subject of the eco-audit; - the group of eco-auditors must receive the appropriate powers, resources and training for the proper performance of the assigned work; - you should be sure that the eco-audit will be supported by the production staff of the audited enterprise. Only after the head of the auditor group, having consulted with the customer, makes sure that these requirements are met, the eco-audit can be started.

When the customer defines the goals, they usually refer to the type of eco-audit criteria against which the eco-audit data is compared. This can be compliance with environmental legislation, investor requirements, eco-management system, code of conduct and environmental policy of the enterprise. The conducted eco-audit, in agreement with the customer, determines the scope of the eco-audit, which will ensure the achievement of the set goals. It is mandatory to develop a report on the results of the eco-audit. Recommendations and the development of an action plan are not mandatory, but may be included in the scope of the audit at the request of the customer.

The scope of the eco-audit indicates its limits, which may include:

- boundaries of the audited territory; - list of technological processes; - time limits; - the need for sampling; - the need to assess impacts outside the site; - the need to audit partners; - nature of interaction with state administration bodies; - the possibility of involving third parties, etc.

All information is documented and transferred to the company being audited before the start of the audit.

**The main requirements for eco-auditors** are their objectivity, independence from the audited enterprise, and competence. During the audit, they must exercise professional diligence, integrity, skill and prudence. The auditors' relationship with the customer should be confidential and trusting. When discussing with the customer the conditions for conducting an environmental audit, the lead auditor must determine and agree on the audit criteria. In order to verify the fulfillment of the specified criteria, relevant information must be collected, analyzed, commented and documented, which will be used as evidence of obtaining the results of the eco-audit. Adequacy of evidence should be confirmed by the fact that competent eco-auditors independent of each other will come to similar audit results when evaluating the same eco-audit evidence. This will guarantee the reliability of the results and conclusions of the audit, which are transferred to the customer in the form of a written report. The lead auditor, after consultation with the customer, determines the structure of the report in accordance with accepted standards.

**Let's consider the procedure for conducting an environmental audit.** According to international standards, the entire eco-audit process is traced as a logical sequence of clearly defined tasks. There are twelve audit tasks (or steps) in total, divided into three groups with four tasks in each. These are the following groups of

tasks: a) preparatory work at the enterprise; b) information collection work (research, survey); c) summarizing the results of the work carried out and their discussion.

Learn more about the first group of tasks. The manager responsible for conducting an eco-audit together with an auditor-consultant qualified at the enterprise (who may later be the head of the audit team during the eco-audit at the enterprise) must, first of all, solve four tasks: a) determine the range of issues that will be considered during the audit, and its goals; b) prepare documents that provide a general idea of the environmental characteristics of the enterprise's activities and its technical means; c) develop the audit protocol (procedure); d) prepare an audit plan.

It is necessary to collect sufficient evidence (evidence) of the eco-audit in order to be able to determine the compliance of the enterprise with the audit criteria. Collected information should be verified by obtaining additional information from independent sources, and unreliable evidence should be flagged as such. Auditors must check the main points of sampling techniques and analytical measurements carried out to obtain the necessary information, to ensure its reliability. On the basis of these documents, inspections of the site, interviews with personnel, the environmental auditor creates his own analytical documents, which can also be illustrated with photographs.

The third group of tasks is a summary of the completed work and its results. The last phase is devoted to the analysis of previously collected audit evidence, obtaining results and developing audit conclusions, which are transferred to the ecomanager for their study by the company's management, discussion with a group of auditors, and further use.

**The final phase of the audit** is reporting to the management of the ecoaudit customer organization. It can be both the company's management (if it ordered an audit) and some other customer organization interested in conducting it. If the customer is an enterprise, the ecomanager will organize a meeting of its management, at which it will be able to clarify the essence of that legal responsibility, or those potential legal problems that await it according to the conclusions of the audit. It will also be able to determine its priorities in the implementation of environmental policy and make decisions on the provision of resources necessary for the implementation of priority measures.

**The audit report must be** checked and certified by a specially accredited verifier, after which it is officially submitted to the audit customer.

### **Self-test questions:**

1. Define environmental audit activity.
2. What are the main requirements for eco-auditors?
3. What is the procedure for conducting an environmental audit?
4. Describe the final phase of the audit.

### **1.9. Examples of special audit techniques.**

A large number of environmental audit classifications can be found in literary sources depending on the selected criteria and degree of detail. Let's consider the most common. It should be borne in mind that the environmental audit is directly related to the ecomanagement system (enterprises, companies, corporations, industries of the region, etc.), other types of ecoaudit are of an evaluative nature and relate to privatization or investment activities (express risk assessment, assessment of the environmental condition of the site ). Thus, we will consider five main types of environmental audit:

a) ecological express assessment of investment risks (investment or financial eco-audit);

b) assessment of the ecological condition of the territory, the owner of which is the enterprise, or the owner changes in the process of privatization;

c) eco-audit of products at the stage of marketing research;

d) technical audit at the stage of production activity;

e) audit of the eco-management system of the enterprise.

The goals and functions are determined depending on the type of eco-audit and are formulated with the participation of the customer.

**Environmental express assessment** is carried out in order to assess the responsibility or risk assumed by the potential owner or investor in connection with the risky environmental condition of the industrial site or the harmful impact of the enterprise on the environment. This type of environmental audit performs investment functions taking into account environmental risks when implementing privatization programs or investment projects.

**The assessment of the environmental condition of the territory** owned by the enterprise is determined in the process of privatization and may have the character of an express assessment if its purpose is to assess investment risks, and may also perform environmental protection functions if this type of environmental audit is carried out regularly and systematically as part of the system eco-management of the region or industry.

**The eco-audit of products** is carried out, depending on the company's wishes, as part of marketing research of the product sales market and may include an overview of the supply, production and sales processes that make up the life cycle of products and an assessment of their impact on the state of the environment and human health. It can be said that the eco-audit of products is an assessment of their environmental cleanliness and competitiveness.

**The technical audit** is used directly by the enterprise in the form of a preparatory environmental review to conclude on the extent to which it complies with the requirements of current environmental legislation and environmental regulations, as well as how effectively the environmental policy of the enterprise is implemented. Such an eco-audit performs the functions of environmental self-control.

**The audit of eco-management systems** is an environmental audit, during which, according to international standards, the presence of documents at the enterprise that determine its environmental policy and give appropriate recommendations for their creation or improvement are checked. **The goal is to**

develop action plans to guarantee environmental safety at the enterprise, implement programs to radically improve production culture, restore the proper condition of technological equipment to reduce leaks and emissions ("greening" technologies), implement operational plans to reduce energy, water and raw material consumption, i.e. resource conservation, determination of ways to minimize waste and improve waste management. **This type of eco-audit is multi-purpose** and functionally ecological and systemic in nature. The choice of goals depends on the customer and the recommendations of the preparatory environmental review. For example, the goals of conducting an audit of the eco-management system (SEM) can: - determine the compliance of the SEM of the enterprise with respect to the SEM audit criteria; - to determine the compliance of the implementation and provision of SEM at the enterprise; - to determine ways of potential improvement of SEM at the enterprise; - to evaluate the ability of effective adaptation of CEM to changes in external and internal conditions of production - to evaluate CEM in the organization with which they intend to enter into a contract (for example, with a potential supplier or with a partner in a joint venture). Out of all five types of environmental audit, the first two are the most widespread. Therefore, it makes sense to consider the procedure for their implementation in more detail, taking into account international experience.

**Ecological express assessment of investment risks.** Express assessment is a simplified environmental audit that can be carried out as per the regulations of the privatization process, as well as according to the requirements of investors (express assessment of investment risks). It can also be complex as a part of the sectoral eco-management system. This type of express assessment was used by the State Food and Agriculture Organization of Ukraine during the implementation of the Ukrainian-Canadian project "Implementation of environmental audit and "green" technologies." The goal of this project was to develop a complex of non-capital-intensive management, technological, economic and economic measures, the implementation of which would bring an ecological effect. The complex goal and short deadlines also required a complex methodology for carrying out express assessments of the eco-management system of the enterprise, industrial sites, technological processes, waste minimization and improvement of cleaning equipment.

It is assumed that the determination of the environmental compliance of the activities of the objects of privatization with the requirements of environmental protection legislation is carried out during the preparation of the section "Characteristics of the ecological state" of the Privatization Plan (Plan for the placement of shares).

The procedure for determining environmental compliance involves: - analysis of the form of state statistical reporting and environmental standards of the privatization object for the current year and three previous years; - preparation of extracts from primary materials of forms of state statistical reporting and environmental regulations; - summarization of primary materials of state statistical reporting; - preparation of conclusions on determining the compliance of activities of objects to be privatized with the requirements of environmental protection legislation; - preparation of special conditions for conclusions; - preparation of a protocol for

determining compliance of the activities of objects to be privatized with the requirements of environmental protection legislation according to the established form; - approval of the protocol for determining the conformity of the activities of the objects to be privatized with the requirements of environmental protection legislation according to the established form; - approval of the protocol for determining the compliance of the activities of objects to be privatized with the requirements of environmental protection legislation by local bodies of the Ministry of Environment (within ten days from the date of submission of the draft protocol).

The procedure for determining environmental compliance is completed by drawing up a protocol with appendices in the form of extracts from primary documents. Conclusions regarding the need to carry out an in-depth environmental survey of privatization objects (environmental audit) are included in the protocol. The Privatization Commission of the object includes the submitted information according to the established form of the specified protocol to the section "Characteristics of the ecological state" of the Privatization Program (Plan for the placement of shares). The scope, conditions and procedure for carrying out an environmental survey are determined in the contract with the Customer, in whose capacity legal and natural persons interested in determining the environmental condition of the business object can act. The results of the execution of the contract are formalized by the act of handing over and accepting the environmental survey. An environmental report is attached to the act of handover and acceptance, which is provided to the Customer in the established form. The contract on the execution of an environmental survey contains the rights and obligations of the contract participants. The financing of the environmental survey works is carried out at the expense of the Customer.

In recent years, in developed countries with a market economy, the problem of liability and costs associated with the ownership of contaminated land has attracted more attention. Therefore, when the owner changes or when solving the issue of investments, the minimization of risks arising from insufficient awareness of the ecological condition of the respective land plot becomes a very urgent task. The process of collecting environmental information is called differently in different countries: site inspection, site assessment, site characterization, property audit, historical audit, etc. In order to unify the terminology used, in the USA, Canada and other countries, for the procedure of the initial assessment of the ecological condition of the land plot (with all structures), a term was adopted, which was translated into Ukrainian as "ecological express risk assessment" or "investment audit".

Such an express risk assessment is the first step on the way to obtaining a complete picture of the ecological state of the land plot and, most often, it takes the form of a questionnaire about the current and past state of activity on this plot, which is capable of influencing the state of the environment in one way or another. The questions are formulated in such a way that a simple answer can be given to them such as: "yes", "no", "no data". A sample of such a survey is given.

Question 1. Has there been use, production or storage of significant amounts of hazardous chemicals on the site occupied by the enterprise?

Question 2. Was industrial waste placed within the boundaries of the site of the enterprise or nearby?

Question 3. Are there underground or above-ground tanks or pipelines on the site?

Question 4. Is there any evidence or written evidence of leaks from them?

Question 5. Is there any vegetation damage on the site. the reasons for which have not been clarified?

Question 6. Are there any stains (or discoloration) of unknown origin on the surface of the soil or buildings?

Question 7. Is a film of petroleum products visible on water surfaces within the site or nearby?

Question 8. Is there any equipment near the site of the enterprise that may pose a risk to human health or the environment due to current or past activities?

Question 9. Does the equipment or structures on the site contain hazardous materials such as polychlorinated biphenyls or asbestos?

Question 10. Do nearby residents use groundwater?

Question 11. Does groundwater flow into nearby surface water?

Question 12. Have there been complaints about the undesirable impact of activities on the land plot on the state of the environment over the past three years?

Question 13. Have there been violations of environmental legislation at the production site in the last three years?

The analysis of the answers to the questions can be carried out by determining the total number of points assigned to each answer according to the following rule: the answer "yes" - 2 points, the answer "no data" - 1 point, the answer "no" - 0 points. The higher the sum of points, the higher the risk, and the more urgent the need for an in-depth study of the site's ecological condition with the involvement of environmental protection specialists. With a score of 13 or more, the risks should be considered high. In this case, to get more based on reasonable information about possible risks, it is advisable to carry out an assessment of the ecological condition of the site. the procedure for which is discussed below.

#### **Assessment of the environmental condition of the site of the enterprise.**

This type of environmental audit can be carried out as part of the environmental survey of the property of enterprises that are being privatized. According to the legislation of countries with a market economy, the owner of a land plot bears full legal responsibility, including financial, for the impact on the environment caused by the polluted state of this plot or activities within its boundaries. Therefore, this owner is interested in receiving objective information regarding such an impact, since without it he will not have a valid idea of the real value of the land plot and the buildings on it.

Not only the owner of the enterprise, but also its potential buyers or investors are interested in the assessment of the environmental condition of the territory where the enterprise is located. The purpose of assessing the environmental condition of the site is to fully and reliably establish the existing and potential level of its pollution and responsibility for it, as well as possible ways to improve the territory of the



enterprise. To achieve this goal, it is necessary to solve the following tasks: - make a historical review of the existence of the land plot, conduct its reconnaissance survey and determine environmental risks; - conduct a site pollution study and assess possible liability for violation of environmental protection legislation; - to develop a plan of rehabilitation measures and roughly estimate their cost.

Thus, the work consists of **three stages, which are discussed below.**

**The first stage is the identification of risks.** This stage includes: - collection of information regarding the use of the site and production activities on it both in the current and past periods; - survey of the site by an environmental specialist accompanied by a person who knows the site and local production well; - a review of the environmental documentation available to the site owner and state administration bodies; - preparation of a report highlighting data on existing and potentially possible sources of pollution within the area. It is necessary to comment on some issues that should be kept in mind when solving the above four tasks. It is desirable to trace the evolution of the use of the site and the buildings on it over the longest possible period, up to the very beginning of active anthropogenic influence on it. At the same time, it is important to find and study the available documentary evidence.

The study of groundwater pollution, especially those that are sources of drinking water supply, requires close attention. At the same time, it is necessary to find out the possibility of moving the center of pollution outside the site. More often than not, the legal and physical consequences when pollution goes beyond the boundaries of the enterprise site are significantly complicated. When surveying the site, the main task is to clarify the issue of all possible impacts on the environment related to the nature of the activities on the site and its topographic features. It is necessary to identify all sources of pollutants entering the natural environment, including solid waste landfills, liquid and waste tanks, storage sites for chemicals, products and equipment that are not in use (mercury lamps, transformers, etc.). The study of possible leaks from reservoirs and pipelines, which lead to soil and groundwater pollution, requires special attention. All visually detected objects causing ecological concern should be photographed, information can be obtained by communicating with production personnel and local representatives.

When considering environmental documentation, all available documents characterizing the enterprise's impact on the environment should be studied: - protocols and acts of inspections; - reports and information on accidents, accidents, salvo discharges and emissions; - forms of statistical reporting of the enterprise, etc. Documents on permits for environmental management, norms of maximum permissible discharge and emissions of pollutants, prescriptions of state control bodies, as well as citizen complaints and documents on the results of their consideration.

The report should include documented factual data on existing sources and centers of pollution (including photographic documents), as well as assumptions on possible impacts on the environment in the future. Risks (high, medium, low) are studied based on available information. Here, the measures necessary to clarify

questionable data and assumptions are outlined. It should be noted that at this stage, samples for analysis are not taken and no measurements are carried out.

**The second stage** is the study of contamination. This is a very responsible stage, which with imperfect planning can lead to significant costs. Therefore, it is advisable first of all, based on the results of the previous stage, to select and analyze a small number of soil, water, and air samples based on a limited list of parameters, to selectively measure noise and radiation levels. According to the results of these studies, a second round of sampling and measurements should be carried out to obtain a complete picture of the contamination of the site. These data are correlated with the current regulations. There may be a need to drill wells to study the hydrogeology of the site and the degree of groundwater contamination.

All research results are documented and included in the report on the work at the second stage, which provides information about the applied research methods, criteria adopted for evaluations, and considerations for remedial measures. The amount of data received should be sufficient to estimate the amount and cost of the expected works on the environmental improvement of the site.

**The third stage** is the planning of remedial measures, the purpose of which is to determine specific measures to reduce for people and ecosystems the amount of environmental risk associated with site pollution. The need for such planning arises when the owner of the plot wants to demonstrate that it is ecologically clean and thereby increase its value; when he wants to avoid possible liability for violation of environmental legislation; when he intends to change the type of land use and in other cases.

The development of the plan begins with a review of a number of existing options for measures and the selection of those that are important for the given area. The most common methods of recovery are considered later. In many cases, it is advisable to conduct planning in two phases. In the first, a pilot plan is developed, within the framework of which methods and technologies acceptable for use of ecological improvement of the site are investigated and the best of them are selected. Second, a full-scale plan is developed based on the choice made. When choosing options for health activities, the multi-criteria task of finding the best of them is solved. Such criteria as the technology's ability to meet regulatory requirements, its compliance with existing time constraints, minimization risk levels for workers and the local population during work and cost minimization.

**In practice**, the problems of ecological improvement of soils and underground waters are most often solved. **There are six groups of soil remediation methods.** The first is the removal of soil to landfills without preliminary treatment; depending on which pollutants are present in the soil, taking into account their concentration and ability to dissolve in water and be transported by underground flow, the appropriate type of landfill should be chosen. The second method is the destruction of non-conservative organic substances: biochemical decomposition is used directly on the site of the enterprise, on specially prepared sites outside the enterprise and in large reactors. Chemical and thermal destruction is also possible. The use of destruction technologies must be accompanied by means of monitoring and regulation to prevent

pollution of the environment by destruction products. The third method includes separation: the properties of substances, such as volatility, solubility, and sorption capacity, are used to transfer them from the soil to another environment from which the pollutant is easily released. The fourth method can include immobilization - these are physical or chemical processes that reduce the mobility of substances in the soil, which prevents them from entering the atmospheric air or the underground aquifer, after which the soil is used for building blocks; it is also possible to enclose the soil in impermeable capsules. The next method is isolation: stopping the contact of the soil with the environment using mechanical barriers. The sixth method is reuse: the contaminated soil is converted into a useful product (such as asphalt) or used as aggregate where possible.

Many of the above technologies can be used for ecological remediation of contaminated groundwater, with the difference that the water must be taken from the aquifer using pumps and fed for appropriate treatment.

**Self-test questions:**

1. The purpose of environmental express assessment and when is it carried out?
2. When is the assessment of the environmental condition of the enterprise territory carried out?
3. Describe the product eco-audit and technical audit.
4. When is the audit of eco-management systems used?
5. Describe the environmental express assessment of investment risks.
6. Stages of carrying out an assessment of the environmental condition of the site of the enterprise.
7. Problems of ecological improvement of soils and groundwater and six methods of soil improvement.

**1.10. The practice of introducing an environmental audit in Ukraine.**

**In the eco-management system of Ukraine, environmental audit should take an equal place alongside environmental expertise and environmental inspection as market forms of ownership and relations develop.** The demand for environmental auditing dictates the services market and the investment market. Table 1 shows the **distinguishing features of these three forms of control** in a mixed eco-management system, although the definition of environmental self-control is more suitable for environmental audit.

Table 1

**The state-market structure of environmental control and review of the state of the enterprise**

Forms of environmental control and inspection	Functions	Sources financing	Objects control or supervision	Subjects of control or review
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<b>Environmental expertise</b>	State environmental protection with environmental research and control	State and the local budget	Pre-project and design decision. Documentation. Construction objects. Economic decisions	Ministry of Environmental Protection and Natural Resources of Ukraine, Ministry of Health, local authorities: management or departments of environmental expertise, public organizations, in accordance with their competence
<b>Environmental inspection</b>	State environmental protection with inspections and control	State budget and deductions	Earth, subsoil, surface waters, atmospheric air, vegetation, animal world, protected areas, industry	State ecological inspection, Ministry of Environmental Protection and Natural Resources of Ukraine, bodies of the prosecutor's office, specially authorized state bodies in the field of environmental protection
<b>Environmental Audit</b>	Independent, environmental investment, nature conservation, market	Funds the customer	Investment projects, credit agreements, contracts, operating enterprises	Licensed independent audit firms, eco-auditors, specialized centers

In the past, back in the days of the totalitarian system, there were attempts to introduce environmental inspection (passportization) of enterprises in our country. But nothing came of it. During the first three years after the approval of the regulation on passporting, the majority of Ukrainian enterprises issued such passports, but during those times there was no need for these documents. A totalitarian system with an anti-market ideology was not able to offer market mechanisms of ecologically safe management. Only now have the conditions begun to be created, which will certainly require market mechanisms and levers, including an environmental audit. This is facilitated by the current nature protection legislation of Ukraine.

The eco-management system in Ukraine is defined, formed and regulated by the Law of Ukraine "On Environmental Protection", which was adopted back in 1991. Currently, amendments have been made to it, which legally enshrine the concept of environmental audit.

According to this Law, the purpose of state management in the field of environmental protection is the implementation of the Legislation, control over

compliance with environmental safety requirements, effective and comprehensive measures to ensure environmental protection, rational use of natural resources, and achieving coordination of state and public bodies in the field environmental protection.

It can be said that state eco-management has four target main functions. This is, first of all, the **implementation of environmental protection legislation, control over environmental safety**, ensuring the implementation of environmental protection measures and achieving coherence of actions of state and public bodies. Of them, the first two target functions are the most developed: **implementation and control**. An appropriate organizational infrastructure has been created under them, which includes the bodies of environmental expertise and environmental inspection. **Less developed target functions of provision and coordination, which are the foundations of the management pyramid**. By the way, the foundation is the same as the building. We can say that the strength of such management foundations can only be ensured by an environmental audit.

**Only by applying an environmental audit can you ensure both the effective implementation of environmental protection measures and the coordination of actions of state, public bodies, local authorities, and enterprises.**

**Table 1** shows the distinction between the functions of eco-audit, environmental expertise and environmental inspection. The main thing is that an environmental audit allows strengthening the management of environmental protection and increasing the efficiency of state eco-management without additional budgetary costs. That is why the state should be interested in introducing an environmental audit and creating appropriate legal and regulatory conditions for its implementation. The mixed state-market system of eco-management satisfies the interests of the state and public and market structures. There can be no conflict of interests in it, especially since the eco-audit fills niches in the management structure that were not previously filled. First of all, it concerns the sphere of action, influence.

For the environmental inspection, the enterprise is a "black box" with initial environmental "information" in the form of wastewater discharges and emissions into the atmosphere, i.e. substances that pollute the environment.

The environmental inspection monitors this initial environmental "information" without interfering with internal processes in the "black box", that is, the enterprise. Internal technological processes and their environmental safety are the business of the company's management and its eco-management system. An eco-audit is required in order to carry out this work in a qualified manner at the level of global and state environmental safety requirements.

**That is, the scope of the eco-audit is the eco-management system of the enterprise**, its production areas and the adjacent local territory at a distance of 5 km along the perimeter, the main technological and auxiliary processes, buildings, equipment.

Environmental safety is guaranteed by environmental legislation through the implementation of preventive complex interconnected political, economic, technical, organizational, state-legal and other measures. Complex measures are carried out by

enterprises in accordance with legally defined environmental requirements. **In market conditions, state requirements are reinforced by competition for product sales markets or attracting investments for development.**

**The market requirements of environmental safety of the enterprise require a systematic independent and objective assessment of the degree of environmental risks.** This can be done only thanks to an environmental audit. Moreover, the results of such assessments are confidential and are intended, first of all, for the company's management. **Thus, a competent and qualified environmental audit contributes to the strengthening of legislative guarantees of environmental safety.**

The modern economy is being reformed. The system of environmental management and audit should also be reformed. It refers to such functions of eco-management as: restructuring of production, privatization, creation of a competitive environment and market pricing, as well as functions of program-targeted distribution of finances, corporatization, decentralization, and flexible rationing and taxation.

These are the functions of mixed environmental management, in which the state management infrastructure operates at the macro level, and the market management infrastructure at the micro level with the use of environmental audit. It may be:

- auditing of decommissioning of enterprises during restructuring of the industry;
- audit assessments of environmental risks, priority measures for environmental improvement of enterprises to be privatized;
- audit assessment of environmental costs;
- audit assessment of resource saving program measures;
- audit protection of corporate interests;
- audit assessment of environmental insurance conditions; - audit assessment of the regulatory framework and others.

All this determines the role of eco-auditing in the reform of the economy of Ukraine and, at the same time, the demand for its services.

**The most relevant is the use of eco-audit during privatization.** This is due to taking into account the environmental factor when evaluating property. The investor, the buyer of state property, will undertake to ensure the environmental safety of production according to European or world standards. This will cause environmental costs, which must be taken into account in the process of determining the value of privatization objects. Moreover, the investor is interested in conducting an independent and objective eco-audit, also according to European or world standards.

Taking into account the conclusions and recommendations of an independent environmental audit in the process of privatization of enterprises can be confidently attributed to the number of important factors of increasing the environmental safety of the region, stimulating the attraction of environmental protection investments from the non-state sector of the economy.

Eco-audit in the process of privatization can be carried out in two directions. **The first** is related to the determination of the ecological state of the area where the

object of privatization is located (**eco-audit of the area**). **The second is due** to the definition of environmental safety of the object itself (**eco-audit of the enterprise**). The ecological value of the area is a set of functions aimed at the reproduction of natural resources and the assimilation of pollutants, or other consequences of technogenic influence. The environmental safety factor of the enterprise itself, which is being privatized, is related to the actual scale of the enterprise's cumulative harmful impact on the environment. To assess such cumulative impact, it is necessary to conduct a **comprehensive environmental audit** of production areas, waste processes, and eco-management systems. This can be done only by specialized environmental audit and engineering firms with highly qualified personnel and firms that have the appropriate licenses.

In the investment process, the state environmental expertise is more involved. But its functions are limited by legislative provisions within the scope of conclusions that determine, establish or evaluate deviations from the requirements or norms of environmental protection legislation. These are mainly the functions of permission for the implementation of investment programs, projects and economic decisions.

Other functions of an environmental audit. They are not only evaluative, but also recommendatory. That is, the eco-audit not only provides conclusions about possible negative effects on the environment, the state of environmental safety, but also assesses the degree of risk, presents qualified recommendations regarding measures that must be taken into account during design or construction, and evaluates their cost. Thus, **the eco-audit is distinguished by its complexity with the implementation of research and engineering procedures**. It is used to a large extent at the pre-investment stage. It can also be used when developing restructuring programs for auditing enterprises that are decommissioned. For complex investment programs and projects, an environmental audit may precede an environmental examination. This can be compared to the financial audit that large firms conduct before the tax inspectorate audits their financial activities.

**Consider eco-audit and "green" technologies.** The term "green" technology has a broad meaning. These can be both resource-saving technologies and directly ecological technologies of land use, coastal fortification, recreational and others. This expression is debatable, both in Ukraine and abroad, experts do not have it unanimous opinion on this matter. But the majority is inclined to define "green" technologies as environmentally friendly production technologies and cleaning technologies. From the market point of view, these are technologies that ensure the production of environmentally friendly products, that is, environmentally friendly technologies. From the point of view of macro-ecological policy, the "greening" of technologies can be shown in the territorial-historical dynamics.

Humanity is now at the crossroads between the second and third epochs, increasingly entering the third epoch at the beginning of the transition from the economic scheme "commodity - money - commodity" to the scheme "ecosystem - natural resources - commodity - money - reproduction of resources and ecosystem". A sign of the "greening" of technologies is the increase in demand on the world market for environmental audits in general, and, in particular, the audit of production

waste minimization. This is one of the types of eco-audit, which can be called technological or technical. It is carried out by bypassing and inspecting the technological process according to the route technological scheme in order to find measures for the "greening" of technologies and production, rational use of resources.

**Let's consider the eco-audit from the point of view of protecting the interests of commodity production.** An eco-audit is performed on the basis of an application by the customer, i.e., a producer, to an eco-auditing firm with the aim of providing qualified comprehensive (legal, environmental, technological, marketing, engineering) or specialized assistance in solving environmental, investment, market and environmental problems.

The environmental audit service is provided on a contractual basis. The goals of the eco-audit are determined in the contract (Contract). They can be different, depending on the customer's problems with suppliers, technological and environmental conditions of production, with state inspection bodies, with investors, partners, and generally with the development of the enterprise and the competitiveness of its products.

An eco-audit can be performed both as part of a set of measures for the financial improvement of the enterprise, and independently. **But in any case, his conclusions and recommendations are of a confidential nature**, which in itself indicates the protection of the interests of the manufacturer. Protection from yourself or from everyone else in the market environment.

From oneself — this is when one's own capabilities of managerial competence have already been exhausted, and the head of the enterprise realized this and invited independent eco-auditors. The conclusions in this case may not be entirely pleasant for management personnel. This view from the outside will be timely and understandable for an intelligent, far-sighted manager. The most important thing is that the ecoaudit will make an objective confidential diagnosis and provide qualified prescriptions or recommendations for treatment.

Protection of the producer's interests in the external environment, especially in market conditions, is based on wider possibilities of eco-auditing in the selection of recommendations and measures than that of the head of the enterprise. This is explained, firstly, by greater awareness of specialized eco-auditing firms. Secondly, such firms have developed their own methodologies or tools for protecting the interests of the product manufacturer, which are their commercial secrets (management "know-how").

We will consider the benefits of conducting an eco-audit for a product manufacturer in more detail. Not all company managers understand the benefits of the eco-management system and systematic eco-auditing. This creates psychological barriers to the introduction of eco-audit. For enterprise managers, implementing or joining the eco-management and eco-audit system may seem like a waste of money. But in reality, the introduction of eco-management and eco-audit standards is a profitable capital investment. This brings:

- reducing waste disposal costs by reducing their mass;



- reduction of costs for raw materials through more efficient use and reduction of the mass of waste;
- reducing production costs through the use of better technologies and increasing the efficiency of the technological process;
- improvement of information on which decisions on the choice of technology are based, which allows more profitable spending of money;
- reduction of water and energy costs through more economical and rational use of them;
- increase in the level of production, because workers work better where they feel the responsibility of management and concern for the well-being of people;
- expansion of sales markets for goods among "environmentally conscious" buyers;
- improving the company's reputation.

**Legislative problems of EA development in Ukraine.** The significant impact of environmental risk is inherent in enterprises of the chemical, oil and gas extraction, pharmaceutical, metallurgical and mining industries, as well as utilities. When determining the audit risk, one should be guided by the recommendations of the International Auditing Practices Regulations (IAP) 1010 "Examination of Issues Related to Environmental Protection in the Audit of Financial Statements". When assessing the audit risk of financial statement verification, it should be taken into account that environmental risk has an impact on all its components: inherent risk, control risk, risk of non-detection.

**The level of inherent risk** should be estimated by the auditor to be much higher if the enterprise has environmental obligations according to current legislation or concluded contracts.

**The risk of control** will increase if, in the presence of environmental aspects of activity, the enterprise does not have their internal control and audit, separate accounting of environmental costs and liabilities is not kept; specialists dealing with environmental issues do not have sufficient qualifications and experience.

**The risk of non-detection** should be reduced in inverse proportion to the increase in inherent risk and control risk related to environmental aspects, and will cause the need to perform additional, specific audit procedures.

Our state understands the need and wants to take a worthy place in the world community, that is why, using international experience, on January 1, 1998, the following international standards were adapted: DSTU ISO 1401097 "Guidelines for the implementation of environmental audits. General principles"; DSTU ISO 14011-97 "Guidelines for conducting environmental audits. Audit procedures. Audit of environmental management systems"; DSTU ISO 14012-97 "Guidelines for conducting an environmental audit. Qualification requirements for environmental auditors." These standards were later replaced by a single standard of DSTU ISO — 19011:2003 "Guidelines for conducting audits of quality management systems and (or) environmental management".

According to international standards, environmental audit is part of the Environmental Management and Audit System (CEMA-EMAS). For the first time in

Ukraine, this system was applied in the Ukrainian-Canadian program "Environmental Management Development (Dnipro River Basin Region)".

The ramifications of environmental problems formed the basis for the selection of different types or directions of environmental audit. Including:

- express audit of enterprises subject to liquidation;
- environmental audit of the territory and locality;
- technical audit (solving the waste problem);
- energy audit; — investment environmental audit;
- audit of managerial nature protection self-control;

The following types of environmental audit are also distinguished:

1) voluntary — carried out exclusively at the request of the company's management;

2) mandatory — conducted at those enterprises, the list of which is determined by law;

3) internal — conducted at the request of the company's management in order to make correct management decisions by internal auditors, i.e. full-time employees;

4) the external audit can be carried out both at the company's own request, and due to the legally established obligation, by independent auditors.

It is safe to say that there is an urgent need for the development of environmental auditing in Ukraine today. Considering the fact that today it is more profitable for enterprises to pay fines for environmental pollution and disposal of waste than to comply with all standards of environmental protection legislation, it is necessary to improve the legislative framework that regulates environmental protection activities. **It is also necessary to ensure the obligation to carry out an environmental audit at all enterprises** that pose an environmental hazard, regardless of their ownership, and to **legislate the obligation to implement the recommendations of the environmental audit.**

It is also necessary to expand the scope of the environmental audit to include objects that are already outside the scope of production activities, but continue to pose a threat to the environment - old oil storage facilities, accumulators of toxic waste (including pesticides and mineral fertilizers), etc. It is necessary as soon as possible to develop and adopt a unified methodological basis for conducting audits, unified requirements for auditors, unified conditions for the investigated object, and to work out other complex issues of environmental auditing.

Thus, it can be said that the environmental audit, being a flexible mechanism in the conditions of a market economy, is designed to become an important tool for realizing the constitutional rights of citizens to a safe environment and environmental safety at the level of individual enterprises, territories and the state as a whole.

To improve the environmental situation of our country, it is necessary to carry out a complex of legislative, socio-economic, technological and system control measures, the main of which is an environmental audit. In this regard, in our opinion, it is expedient to intensify the work of the legislative and executive branches of government by involving domestic environmental auditors, who already have some

practical experience in this field, as well as the development of international best practices, in the relevant developments.

### **Self-test questions:**

1. What are the distinguishing features of the three forms of control (ecological examination, ecological inspection and ecological audit) in the mixed system of eco-management of Ukraine?
2. Why does a competent and qualified environmental audit contribute to the strengthening of legislative guarantees of environmental safety?
3. In which domestic sphere of the modern economy is eco-audit the most relevant?
4. In what areas should an eco-audit be carried out during privatization?
5. What recommendations should be followed when determining audit risk?

### **1.11. Experience of using environmental audit abroad.**

For the first time, environmental audit (EA) began to be used to control the activities of large industrial corporations in the United States. Considering the environmental factor as one that needs more and more attention, and in view of a number of accidents, large industrial corporations **introduced a system of internal control**, the purpose of which was to assess the negative impact on the environment. The task of the EA was to inform the board of corporations and their shareholders about measures to comply with the current environmental protection legislation and about the risk of possible accidents, considering the impact on the environment.

**In 1989, the International Chamber of Commerce (ICC)** developed a concept of environmental audits approved worldwide. Environmental auditing was defined as an in-depth permanent analysis of environmental protection activities of enterprises, and its voluntary nature was emphasized. The approach proposed by MTP was recognized by industrial companies, as it allowed their managers to ensure control over the state of environmental protection, as well as monitor work in accordance with environmental regulations.

**In 1993, the Commission of the European Communities came up with the first draft of mandatory environmental audit rules.** According to the European standard, an environmental audit is an independent testimony in the interests of the manufacturer and the state, the level of environmental efficiency of enterprise management and the use of technological equipment in order to increase the competitiveness of products.

Initially, the environmental audit in developed foreign countries acted as a means of protecting the interests of business structures, was aimed at reducing the level of risk to the environment and human health, and assisting in the regulation of measures in the field of environmental protection. In the early 1990s, many commercial banks began to use the EA procedure in order to prevent the risk of non-payment of their borrowers' loans and bankruptcy in connection with their activities

in the field of the environment. The World Bank and the European Bank for Reconstruction and Development use EA to evaluate the activities of companies financed by them. The decision of these banks on the allocation of investments is made taking into account compliance with EA requirements. In a number of countries, since the 90s, national standards in this field have been adopted.

Great Britain became the leader in the approval of new market instruments of environmental management and audit, where in 1990 the new "Environmental Act" was adopted, and in 1992 - the Standard in the field of environmental management systems **BS 7750**, prepared and issued by the British Institute for Standardization in accordance with the request of the British Confederation Industries. The standard contains recommendations for proactive environmental auditing, which affected the improvement of the environmental characteristics of the organization's activities as a whole. BS 7750 includes a description of the environmental audit procedure and details the requirements for the audit plan.

**BS 7750 was adopted by Finland, the Netherlands and Sweden. France, Ireland and Spain have developed their own standards.**

In March 1992, the European Community issued "Requirements for eco-auditing". The purpose of this document is to create incentives for the use of environmental audit techniques to evaluate the activities of enterprises, which includes not only the verification of compliance with the requirements of environmental legislation, but also the tasks of the enterprise's own environmental policy.

In 1993, the Council of the EU put into effect the "Rules for voluntary participation of companies in the industrial sector in the Ecomanagement and audit scheme of the European Community" (**Ecomanagement and audit scheme or EMAS**). This document is designed for companies (including small and medium-sized enterprises) that carry out industrial activities. It is assumed that in the future the EA provisions established for the industrial sector will be used in other areas of activity, such as trade and the provision of services to the population. A company that decided to become a member of EMAS, must fulfill a number of conditions, namely: officially accept the proposed environmental policy; conduct an audit of one's activities and, taking into account its results, develop an environmental protection program; implement an environmental management system; to ensure an environmental audit, as well as to prepare an Environmental Statement.

Enterprises have been able to carry out certification in accordance with EMAS requirements since 1995. For this purpose, a register was created for the accreditation of firms and monitoring of their activities. If the enterprise or firm does not meet the declared requirements in the field of environmental policy, it is excluded from the register. Effective application of the EMAS system began at the end of 1995, when European entrepreneurs joined the environmental audit system. Already in March 1996 142 companies participating in the implementation of this program were registered in the EU, among which 114 companies (80%) were represented by Germany.

It should be noted that the number of enterprises interested in EMAS is steadily growing. However, there are significant differences between the number of firms and environmental experts accredited in different states in the field of EA. Thus, in 1998, 247 eco-auditing firms were accredited in 11 EU countries. The total number of enterprises registered in this system increased from 15 in October 1995 to 1,046 in October 1997. The wide implementation of environmental audits abroad is due to two main reasons: 1) environmental indicators are becoming an increasingly important factor in the competitive struggle; 2) economic and administrative sanctions for violating the requirements of legislation in the field of environmental protection and ecological standards are being strengthened.

The existing ecological situation in Ukraine and the trends of its change are largely determined by industrial production and economic activity in general. Despite individual successes and achievements, the general picture here continues to deteriorate, which may lead to an environmental crisis in the future. The main reason for this situation is **the low efficiency of the existing mechanisms of environmental control and management in industrial production**, mainly based on command-administrative methods and coercion. The development of environmental audit in our country is a necessary step for the integration of national and international interests in the conditions of modern socio-economic development.

The prerequisites for its occurrence in Ukraine are, first of all:

- first, awareness of global environmental problems and recognition of the priority of their solution along with economic and social problems; secondly, the process of Ukraine's integration into the world community.

The need to conduct an environmental audit of domestic organizations has economic, ecological and social aspects. These three groups of factors, which act on each individual business entity in a different way, are often interdependent. Thus, the deterioration of the environment leads to the degradation of the natural world, the destruction of ecosystems and the emergence of social problems (deterioration of the health of the nation and the ecological quality of life), which at the same time turns into losses for the economy, since the company suffers losses by paying for emissions of harmful substances and ecological damage to the surrounding natural environment. With the undoubted importance and importance of environmental and social factors, economic reasons have the greatest influence on the decision to conduct an environmental audit.

In the group of economic factors, the desire to attract national and, especially, international investments is the biggest incentive for the activation of environmental protection activities. Most investors, as a rule, require mandatory environmental audit. First of all, this requirement applies to investments made through the European and International Banks for Reconstruction and Development. In this case, the audit is conducted according to the methods of specialized banks, mainly Western firms operating in the Ukrainian market of environmental services. The auditor's opinion affects the bank's final decision to invest in the project. Obtaining a positive audit opinion requires significant preliminary preparation and active activities in the environmental field from the organization trying to attract Western investments. In

this case, conducting an environmental audit by a Ukrainian audit firm will bring the business entity's activities in the environmental sphere into compliance with current legislation, and thus, eco-auditing and consulting play an important role in preparing for the receipt of investment investments.

Domestic enterprises that have access to international markets are forced to carry out an internationally agreed EA procedure and obtain a corresponding certificate on the environmental safety of production and products. That is, if the enterprise meets the requirements of EMAS and international standards ISO series 14000 - the competitiveness of its products on the world market is ensured.

The analysis of international experience shows the wide practical application of the EA procedure as a means of obtaining and evaluating environmental information about an enterprise or other economic entity in order to develop the necessary corrective measures and make decisions at different levels of management, from the management of a specific enterprise, organization to state authorities. At the same time, like any field of activity, environmental audit in Ukraine needs the development of methodological and organizational forms, a complete system of scientific and methodological approaches to its implementation, which should become the subject of further scientific research.

### **Self-test questions:**

1. When and where was environmental audit (EA) first used?
2. What and when did the International Chamber of Commerce (ICC) propose?
3. Which organization came up with the first draft of mandatory environmental audit rules?
4. For what purpose have many commercial banks in the West begun to use the EA procedure?
5. Where and when was the Standard in the field of environmental management systems BS 7750 adopted and which countries joined this process?
6. When did the certification of enterprises in accordance with EMAS requirements begin? What does this abbreviation mean?
7. What were the reasons for the widespread introduction of environmental audits abroad?
8. What are the prerequisites for the emergence of EA in Ukraine?
9. How is the competitiveness of domestic products ensured on the world market?

### **List of recommended literature**

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