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ENVIRONMENTAL AUDIT AS ELEMENT OF THE ECO-MANAGEMENT SYSTEM OF UKRAINIAN IRON ORE MINING INDUSTRY

Main principals, methods and juridical procedures of ecological audit of mining plants were considered in context of international practice. Research of mining plants production particularities in ecologisation context was carried out. Main nature pollution factors of mining plants were considered.

Keywords: nature pollution; mining industry; mining plants; ecologisation of production; environmental audit.

Introduction. One of the problems of management and its part referring to environmental management is to preserve it as a tool-kit implementing the principles of sustainable development. This requires the adaptation of the basic management functions to these conditions, which in particular should include accounting and controlling. Environmental audit adjoins to the mentioned functions. This is due to the fact that enterprises, especially mining, have negative environmental characteristics, and are not directly interested in the implementation of these management functions [1].

Environmental audit as an independent market instrument of environmental regulation has evolved in the U.S. in the early 70's, when some of the largest industrial corporations began to develop their own programs of independent assessment carried out by industrial production companies of environmental legislation. Almost at the same time, the programs of environmental audit began to be implemented at the European companies [2].

The issue of environmental audit in Ukraine attracts more attention of scientists. Ukrainian scientists, such as V.J. Shevchuk, Y.M. Satalin, V.M. Navrotskyj (2007), L.I. Maksymiv, A.A.(2011), A.A. Sadekov (2002), G.P. Serov (2000) and others work fruitfully in this direction.

Objectives and methodology. However, the analysis of recent publications indicates that the peculiarities of the mining industry of Ukraine are not enough studied and measures for its improvement are not formulated. Therefore, the aim of this article is to identify the main areas for improvement of environmental audit techniques and the conditions for sustainable development.

The main theoretical methods of research are analysis, synthesis and formalization. The method of expert assessments is used for the determination of the legal provisions regulating environmental audit in Ukraine.

In many countries, especially in Member States of the European Union (EU), legislation contains requirements for conducting environmental audits in enterprises, among other market instruments of environmental regulation. Most of them are designed to encourage voluntary environmental performance of businesses, improve their performance by implementing environmental management. However, an appropriate attention to the promotion of environmental audit has not been given. The implementation of Eco-Management and Audit Scheme gave the greatest impetus to its development in the EU (EMAS, 2013) [3,4].

theoretical solutions and legal basis. As defined by the International Chamber of Commerce, an environmental audit is a tool of management that covers a systematic, documented, periodic and objective evaluation of organizational structure functioning, management and equipment in order to protect the environment. This means that one can use it to analyse the environmental activities and assess environmental policies, including regulatory compliance and standards.

In the Member States of the European Union environmental audit is seen as a market tool of environmental man-

agement, which is used by management organizations on a voluntary basis. Through this, several management problems of environmental audit can be solved, like the following:

- acquiring the information about the level of company compliance with established environmental requirements (both legislative and developed by the organization);
- risk analysis and internal investigation of accidents or emergency situations reasons that result (or could lead) to the environmental impacts and identification of damage inflicted to human health;
- acquiring the information about improving the environmental performance, reduce of costs associated with the use of natural resources, raw materials, energy etc.;
- an estimate of current state to a desired (during the design, implementation and certification of environmental management systems);
- completion of financial institutions' requirements (presenting the results of environmental audits in obtaining credit, insurance, etc.);
- identification of cases that may lead to liability of organization committed (including earlier committed) violations;
- acquiring the information that could affect the value of assets during the buying and selling procedures (including on environmental pollution and changes in the natural resources that are the result of the past performance)[5].

The Law "On Environmental Audit" [6] and the State Standard of Ukraine (DSTU) ISO 14001-2006 "Environmental Management Systems. Requirements and guidelines for usage" [7, 8] are the main Ukrainian legislations on regulations of environmental audit issue.

The legislation stipulates that an environmental audit is a documented systematic, independent assessment process of environmental audit object. It includes the collection and objective assessment of evidence to match certain activities, events, conditions, systems of environmental management and information on these issues according to the legislation of Ukraine on environmental protection and other environmental audit criteria [5].

Main Results. The main goals and objectives in the field of environmental audits based on international best practices include:

- gathering reliable information on the environmental aspects of the production activities of the facility and the formation of the environmental audit findings;
- installation of amenability according to the legislation requirements on environmental protection and other environmental audit criteria;
- evaluation of the environmental auditing facility impact on the environment;
- evaluation of the effectiveness, completeness and validity of measures for environmental protection at the site of environmental audit;
- assistance for the business entities in the self-regulation of internal environmental policy, shaping the priorities of preventive measures for the implementation of environmental requirements, rules and regulations;

- creation of tools for implementation the key environmental management means and provision of sustainable development;

- the integration of activities in the field of environmental protection and other spheres of activity.

The law provides two types of environmental audit in Ukraine: voluntary and mandatory. Voluntary audit is conducted on the audited entity management request or by consultation with management, if the client is the third audit stakeholder. Mandatory audit is commissioned by the concerned state authorities for facilities or activities that are highly hazardous for environment.

Legislation also defines a list of cases in which a mandatory environmental audit in Ukraine is conducted. It can be bankruptcy, privatization, transfer to the concession objects of state and municipal ownership, transfer or acquisition of state or municipal property, the transfer of long-term lease of state or municipal property, the creation of objects based on state and municipal property joint ventures, environmental insurance facilities, completion of the

production sharing agreement under the law, in other cases provided by law.

Currently, an environmental audit is carried as an order from business entity (industries and companies, international financial institutions and private investors) to obtain an objective assessment of the environmental aspects of the company, including the planning, selection of the optimal strategy, deciding on predictable investment. Ultimately, the results of an environmental audit are the basis for the decisions about:

- appropriateness or non-appropriateness of the company's activity to the applicable regulatory requirements;
- the effectiveness of the management system;
- the value of the potential environmental risks and the importance of their consequences;
- ecological and economic efficiency of implemented measures;
- the possibility of self-overcoming the consequences of their activities.

Table 1. The dynamics of main products of mining industry production in Ukraine in 2005 – 2011, million tons

Amount of production	2005	2006	2007	2008	2009	2010	2011
Iron ores and concentrates, non- agglomerated	69,5	74	77,9	72,7	66,5	78,5	80,9
Iron ores and concentrates, agglomerated	65	68,8	72,8	64,1	55,9	61,8	64,6

* Source: Compiled by the author according to the data from <http://www.ukrstat.gov.ua>

An environmental audit in the business of mining industry has a particular importance. Most of the Ukrainian mining enterprises specialize in the production of one type of iron ore, ore pellets, and iron ore concentrate, or mined ore. The biggest extractor in Ukraine is Kriviy Rih Iron Ore Factory that annually produces about 7 million tons of raw materials. The share of enterprises in total output reaches 43%. Kriviy Rih Iron Ore Factory is controlled by "Metinvest" holding and the group "Privat".

Iron ore concentrate (enriched ore) is produced by six plants: Inguletskiy, Pivdennyj, Pivnychnyj, Tsentralnyj, Poltava Mining Factories and Arcelor Mittal Kriviy Rih. Inguletskiy

skiy GZK (Mining Factory) is the largest manufacturer in this market is controlled by Metinvest.

In recent years, enterprises of mining industry increase volumes of production (table 2).

Market research of iron ore indicates the presence of significant natural potential for the development of the mining sub-sector and reserve capacity for growth in its production. At the same time, the domestic demand for the products listed in the analysed period was reduced significantly influenced by changes in the external and internal marketing environment.

Table 2. Consolidated emission of hazardous air pollutants by sector in Ukraine for 2008-2010, thousand tons

Kind of economic activity	2008	2009	2010
Mining and quarrying	968,9	824,5	851,7
Manufacturing	1510,7	1204	1347,5
Production and distribution Electricity, gas and water	1632,1	1571,7	1601,9
Transport and communication	227,3	203,2	195,8

* Source: Compiled by the author according to the data from <http://www.ukrstat.gov.ua>

Specificity of iron ore consumption underlies that raw material is fully used within the same industry: steel manufacture for the production of almost one type of item such as cast iron. Thus a significant role in the shaping of the demand for it plays the demand for cast iron, and the other the ratio between primary and processed iron ore and some of its species.

Presented data confirms the capacity of production of iron ore, which is a positive development for the economy and for social and economic development of the country. Meanwhile, against the backdrop of these positive trends the threat of excessive load on the environment is emerging.

Mining industry in Ukraine significantly pollutes the environment by harmful emissions which affect the health of population; flora and fauna in Ukraine. Unfortunately, official statistics do not disclose this information on sub-ore mining and metallurgy in general, although it is possible to evaluate

its effect on total pollution by extrapolating its share in GDP (35%). Following this hypothesis, it can be argued that a third of waste and toxins created in the metal industry.

Nowadays, at the metallurgical complex of Ukraine environmental audit is conducted at the request of creditors, including the EBRD (European Bank for Reconstruction and Development) and to obtain certification under ISO 14000. These activities are conducted primarily to enhance the prestige and image of the company by the customer and for the customer, without having any preferences from the state.

Owners of the companies do not want to show the most of the data and try to make it classified as confidential, and the state authorities are not legally required to disclose fixed demand values, arguing that this reporting is not required to disclose to the public.

Given the heavy workload of these companies on the ecology of Ukraine, it is necessary to control and monitor

iron factories for the compliance with environmental legislation, the implementation of environmental protection measures, planning, taking into account environmental factors, including environmental costs in the cost of production.

Herewith an environmental audit on mining companies has to be carried out not only at the stage of the nomination and approval of a project, but also in the operation of enterprises and the implementation of various programs and activities. It has to be performed at the initiative of that body that directly controls the environmental conditions and activities that potentially affect it.

Conclusion and discussion. The main purpose of the audit should be to identify adverse impacts on the environment as a result of operation of sampled enterprises and identify ways to overcome them.

Thus, the implementation of environmental audits requires the improvement of legislation and regulation. Given the interest of stakeholders it must be open to the public. Specific indicators must be identified and released without fail.

Environmental audit of mining companies certainly has its specifics and can also be used for the development of environmental monitoring to assess the impact of companies on the environment for the development of sectoral and regional environmental programs, the implementation of environmental insurance.

Among the main objectives of environmental audit mining companies are the following:

- obtaining the reliable information about the entities on natural resources and environmental protection issues;
- search for untapped reserves for efficiency measures and monitoring their full implementation in accordance with applicable legislation;
- identification of ways of reducing the negative impact of mining activities on the environment and the financial risk of entities, insurance and financial-credit organizations;
- analysis of compliance with environmental legislation, legislation on mineral resources, mining legislation and reducing penalties.

Besides, single scientific method of environmental audit in the business of mining complex has not been created. Exceptions are the companies that are members of the holding "Metinvest". Not-financial statements are prepared

on the basis of GRI, with the following components: materials, energy, water, bio diversity, emissions, waste products and services, compliance, transport, and general aspects (Global Report Initiatives, 2013). There is also a publication of key indicators of environmental performance which are displayed in the report.

The results, of the conducted by the author the legal provisions regulating environmental audit in Ukraine, showed that the basic principles of this type of audit in general is normalized, the basic terms and concepts, types and stages are established. Besides that, introducing the International Standard ISO 14001-2006 "Environmental Management Systems. Requirements and guidelines for use" will regulate this matter more at the level of regulations [7].

Environmental audits at ore mining sub-sector in Ukraine are generally not systematic, and information about its results often is in the conference character and not disclosed publicly.

Improving the environmental audit in the business of mining complex will facilitate the development and implementation of a unified scientific methods of its realization based on industry characteristics and requirements of international standards. It will involve qualified professionals, greater environmental and social responsibility of metal industry.

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АУДИТ НАВКОЛИШНЬОГО СЕРЕДОВИЩА ЯК СЕГМЕНТ СИСТЕМИ ЕКО-МЕНЕДЖМЕНТУ В ГАЛУЗІ ВИДОБУТКУ ЗАЛІЗНЯКУ

Розглянуто основні принципи проведення екологічного аудиту підприємств гірничодобувної промисловості. Вивчено нормативно-правове регулювання та міжнародний досвід проведення екологічного аудиту. Вивчено особливості природоохоронної діяльності гірничо-збагачувальних підприємств України в контексті екологізації їх діяльності.

Ключові слова: забруднення навколишнього середовища, гірничодобувна промисловість, державний бюджет, гірничо-збагачувальний підприємства, екологізація виробництва, екологічний аудит.

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АУДИТ ОКРУЖАЮЩЕЙ СРЕДЫ КАК СЕГМЕНТ СИСТЕМЫ ЭКО-МЕНЕДЖМЕНТА В ОБЛАСТИ ДОБЫЧИ ЖЕЛЕЗНОЙ РУДЫ

Рассмотрены основные принципы проведения экологического аудита предприятий горнодобывающей промышленности. Изучены нормативно-правовое регулирование и международный опыт проведения экологического аудита. Изучены особенности природоохранной деятельности горно-обогатительных предприятий Украины в контексте экологизации их деятельности.

Ключевые слова: загрязнение окружающей среды, горнодобывающая промышленность, государственный бюджет, горно-обогатительный предприятия, экологизация производства, экологический аудит.