The Structure of Training Program and Advanced Training of Enterprise Managers in Order to Ensure Environmental Safety

E N Abanina\textsuperscript{1, a}, Yu S Sergeenko\textsuperscript{1, b}, O V Devyatov\textsuperscript{1, b}, O Yu Ganyukhina\textsuperscript{1, a}, Yu M Nikitenko\textsuperscript{2, b}

\textsuperscript{1}Federal State Budget Educational Institution of Higher Education "Saratov State Law Academy", Volskaya st., 1, 410056 Saratov, Russia
\textsuperscript{2}The Faculty of Law, Leningrad State University named after Alexander Pushkin, St. Petersburg sh., d. 10., Pushkin, 196605, St. Petersburg, Russia

E-mail: \textsuperscript{a}elena-abanina@yandex.ru, \textsuperscript{b}ulya.sergeenko@yandex.ru

Abstract. Large, medium-sized and small enterprises have violation of environmental requirements and negative impact on the environment quality through emissions, discharges, waste generation. The authors suppose that one of the causes of a high degree environmental pollution in the course of economic activity by enterprises is the lack of a system for training managers and specialists in specific courses with binding studying regulatory documents on environmental safety. The article analyzes the reasons for necessary development of a compulsory program of training and advanced training of business managers in order to ensure environmental safety. The dependence of the level and complexity of preparation on the level of environmental hazard of the enterprise is shown. In order to ensure environmental safety it is necessary to define the purpose and objectives of training programs for managers. At the end, the authors present the developed model structure of the training program and advanced training of enterprise managers in order to ensure environmental safety.

Introduction

Environmental safety of regions is imperative for sustainable development of the region, is the basis of preservation of natural systems, and maintain environmental quality. The basic meaning of environmental safety associated with the necessity of compliance with environmental regulations. The violation of such regulations affects the public health seriously and leads to the destruction of the stability of ecological systems [1].

In order to follow the goals of ensuring environmental safety and sustainable development, enterprises in many countries of the world are encouraged to develop environmental innovations actively and to exercise greening of production. It is about “developing any new or significantly improved products (goods or services), processes, and organizational changes or marketing solutions that reduce the consumption of natural resources (including materials, energy, water and land) and reduce emissions of harmful substances during the entire life cycle” [2]. Unfortunately, for example, in Russia, a small number of enterprises apply greening production tools (for example, creating and implementing a new waste management system) and are aware of the benefits of green manufacturing. Enterprises often complain that it is burdensome to follow changes in environmental requirements; especially it is difficult for them to understand which requirements they should comply directly [3]. Resolving the current situation can help the environmentally competent head of the company.

Russian legislation establishes the obligation of business managers to have training in environmental safety. Also, the obligation to provide training related to preparedness for emergency and other abnormal situations and response actions for persons managing an organization is provided for by ISO standards on environmental management [4].
However, at present in Russia and in many other countries there are no appropriate requirements for the managers training, as well as the procedure for the approval of training programs for their preparation.

The purpose of this work is to develop model structure of the training program and advanced training of enterprise managers in order to ensure environmental safety.

Tasks of the research:
- identify threats to the environment from individual objects of economic activity, depending on their danger;
- determine the complexity of the training programs for enterprise managers depending on the hazard levels of the facilities;
- define the goal and objectives of the general program for training managers to ensure environmental safety, regardless of the hazard level of enterprises;
- theoretically develop model structure of the training program and advanced training of enterprise managers in order to ensure environmental safety.

Results and discussion

It is indisputable that environmental safety is an integral part of general safety in the work performance on site that poses a potential hazard to the environment. Therefore, the manager must have the necessary level of training to ensure the security of his or her enterprise.

Such managers can be recognized as subjects of environmental danger - persons whose activities can create an environmentally dangerous situation. Of course, these categories of citizens, as a rule, already have a great deal of practical management experience and special education. They studied the basics of ecology, life safety, the fundamentals of law and economics. However, since they got their education, these managers have received new work skills, and faced with new features of work and difficulties associated with the necessity to ensure environmental safety. Therefore, competent management of enterprises is necessary to prevent environmental disasters, to preserve the lives of people on earth.

Table 1 – Correspondence of environmental threats to business objects depending on their danger

| Threats | Potential consequences |
|---------|------------------------|
| energy facilities (for the provision of electric energy, gas and steam) | air pollution [5], thermal water pollution |
| hydraulic structures | water pollution, coastal destruction, extreme events (floods) |
| facilities for the operation of radiation sources, nuclear facilities, including nuclear plants | degradation of natural objects, population exposure, disease and death of the population |
| facilities for the oil extraction, natural gas, heavy metals, precious metals | 1. soil contamination with high-tech material [6]; land degradation, water bodies |
| facilities for the transport, storage, destruction of chemicals, including weapons | chemical contamination or damage to people, animals and plants, earth pollution, water with dangerous chemicals |
| facilities that emit pollutants into the air | air pollution, subsequently disease of the population |
| facilities that discharge pollutants into water bodies | polluted drinking water, transboundary pollution, extreme events (floods) [7] |
| facilities involved in the storage, disposal, disinfection, industrial and consumption waste disposal | pollution and land degradation, large amounts of legal and illegal waste landfills [8], air pollution due to landfill gas emissions [9], air pollution from waste incineration [10] |
Enterprises headed by managers are called objects of environmental hazard. These enterprises may have a negative impact on nature and man. Most of the enterprises, depending on the implementation of economic activity, can be sources of various threats to certain objects of nature and to the natural environment as a whole. Under the threat of environmental safety, we understand the types of economic or other activities that have a harmful impact on the environment and pose a danger to human life and health due to violations of environmental safety requirements.

The table shows the types of objects (enterprises) that pose a threat to environmental safety and potential consequences arising in case of violation of environmental requirements.

Based on the data in the table, we can conclude that every object of environmental hazard presents threats of varying degrees of danger to nature and to humans. Therefore, it is necessary to prepare managers of enterprises in the field of environmental safety. Moreover, for especially dangerous objects, it is necessary to conduct additional or special training and certification of managers (see Table 2).

**Table 2 – Compliance of training programs for enterprise managers with environmental hazards**

| Threats                                                                 | Training of managers                                               |
|------------------------------------------------------------------------|-------------------------------------------------------------------|
| energy facilities (for the provision of electric energy, gas and steam) | training and certification in the field of industrial safety       |
| hydraulic structures                                                   | training and certification in the field of industrial safety       |
| facilities for the operation of radiation sources, nuclear facilities, including nuclear plants | training and certification in the field of atomic energy use, radiation safety |
| facilities for the oil extraction, natural gas, heavy metals, precious metals | training and certification in the field of industrial safety       |
| facilities for the transport, storage, destruction of chemicals, including weapons | training and certification in the field of industrial safety, chemical safety, special training and certification on the organization and work safety |
| facilities that emit pollutants into the air                           | general environmental safety training                              |
| facilities that discharge pollutants into water bodies                 | general environmental safety training                              |
| facilities involved in the storage, disposal, disinfection, industrial and consumption waste disposal | general training and certification in the field of environmental safety, special training and certification on the organization and work safety |

One of the main reasons for the high level of environmental pollution at work is the lack of a system for training managers with binding studying regulatory documents on environmental safety. The head of the company should have a clear understanding of the system of environmental legislation and know the hierarchy of laws. (Figure 1).
In this connection, in the course of general training of managers in order to ensure environmental safety, it is necessary to focus on the legal environmental issues necessary for a manager to perform his or her duties.

Before developing separate training programs for managers, it is necessary:
- to form up an obligatory minimum set of legal (economic, technical) knowledge for each profession;
- to establish a law on the state level about the admission of the manager to the management of a potentially dangerous object to the environment, that may be possible only after passing an exam before a special commission on the established minimum set of ecological knowledge;
- to enshrine at statutory level that the training of the head should be carried out at the expense of the enterprise, and at especially dangerous facilities - at the expense of the state;
- to hold legal responsibility (disciplinary (up to dismissal), administrative and other), for refusing to train, to pass an exam, and for unsatisfactory passing an exam.

Managers of enterprises who pose a small risk to the environment can receive training in the following general programs:
1. Environmental safety management systems.
2. Environmental protection.
3. Environmental management and audit based on ISO (International Organization for Standardization) standards.

Such general training programs will provide the minimum knowledge necessary to manage any enterprise in order to ensure environmental safety. In addition, training in such programs will not require large funding, since such training can be carried out both on the basis of educational organizations and private centers with qualified teachers in the field of law, ecology and economics, but without access to special knowledge (for example, in the field of atomic energy).

Russian companies have already successfully used this opportunity. For example, in such public corporation as System of Oil Pipelines in 2010–2012, 47 employees of the company (managers

**Figure 1.** The system of regulatory documents on environmental safety
responsible for making decisions that could affect environmental safety) were trained in the environmental protection and environmental safety training program. Besides training, professional development, a number of activities have been undertaken to improve the environmental culture of workers [11].

In order to ensure environmental safety, the purpose of the general program of training managers, regardless of the level of enterprises' risk, is to obtain specialized knowledge in a specific field of activity - ensuring environmental safety. The purpose of advanced training of managers in this area is to update the knowledge, principles and practices of management in accordance with the requirements for ensuring environmental safety.

Regardless of the level of hazard of enterprises, the main tasks of the general program for training managers to ensure environmental safety are:

- the formation of a holistic view of the environmental safety management system at the enterprise level;
- the development of the ability to make effective decisions in environmental emergencies;
- studying how to ensure economic growth with the lowest possible depletion of natural resources [12];
- training on the transition from traditional production with a potential environmental threat to environmentally responsible production [13].

Conclusions

Based on the identified data, we can offer the following model structure of the training program and advanced training of enterprise managers in order to ensure environmental safety.

The first block - environmental legislation (international norms and principles, federal legislation, state legislation, domestic legislation).

The second block - organizational and legal means of ensuring environmental security: the work organization on environmental protection; environmental impact assessment procedure of pre-planned, pre-project and project materials; environmental standards and regulations; environmental certification system; environmental audit; environmental management system; environmental planning; environmental monitoring procedures; environmental reporting; environmental control and supervision.

The third block - economic means of ensuring environmental safety: payment for a negative impact on the environment; ecologically oriented tax policy; environmental equipment depreciation; concessional lending for resource-saving and environmental programs; environmental insurance.

After the completion of training, you should pass an exam. It is necessary to improve the qualification of general and special programs once every three years. This will enable business managers to be always aware of changes in legislation and to maintain the necessary level of environmental safety in their organization.

The reported study was funded by RFBR according to the research project № 19-011-00416.

References

[1] Abanina E N, Timofeev L A, Agapov D A, Sorokina Yu V, Ustinova A N Systems of Environmental Security of Urbanized Territories Within the Framework of the Program of Ecological Development of Urbanized Territories IOP Conf. Series: Earth and Environmental Science, Volume 224 (2019) 012031. DOI:10.1088/1755-1315/224/1/012031
[2] Hojnik J., Ruzzier M., Manolova T. Eco-Innovation and Firm Efficiency: Empirical Evidence from Slovenia Foresight and STI Governance, Volume 11, N 3, pp. 103–111. DOI: 10.17323/2500-2597.2017.3.103.111
[3] Effectiveness of Regulation: Literature Review and Analysis, Report SC090028, Environment Agency, Bristol, UK.
[4] ISO 14001:2015 Environmental management systems - Requirements with guidance for use, IDT.
[5] Rybenko I A; Ermakova L A Modelling of CWS combustion process IOP Conference Series: Earth and Environmental Science Vol. 45 (2016) 012016. DOI:10.1088/1755-1315/45/1/012016.
[6] Damarmoyo K S, Handayani S, Utami S N H, Indarti S Soil physical properties and abundance
of soil fauna in conventional and organic rice field *IOP Conference Series: Earth and Environmental Science* Volume 215 (2018) 012009 doi:10.1088/1755-1315/215/1/012009

[7] Prykhodko M M, Romaniuk V V, Kukhtar D V, Rodzinska O V. A modern approach to monitoring the territories of solid waste landfills 2018 *17th International Conference on Geoinformatics Theoretical and Applied Aspects* 17, Theoretical and Applied Aspects URL: http://www.earthdoc.org/publication/publicationdetails/?publication=93296 DOI: 10.3997/2214-4609.201801829

[8] Weiβhuhn P., Müller F., Wiggering H. 2018 Ecosystem vulnerability review: proposal of an interdisciplinary ecosystem assessment approach *Environ Manage.* 61(6):904-915. DOI: 10.1007/s00267-018-1023-8

[9] Sicard P., Agathokleous E. Araminiene V., Carrari E., Hoshika Y., Paoletti E., De Marco A. 2018 Should we see urban trees as effective solutions to reduce increasing ozone levels in cities? *Environ Pollut.* 243(Pt A) 163-176. DOI: 10.1016/j.envpol.2018.08.049

[10] Hamzah Z, Shuhaimi S N A Biochar: effects on crop growth *IOP Conf. Series: Earth and Environmental Science* Vol. 215 (2018) 012011 doi:10.1088/1755-1315/215/1/012011

[11] Bolshakov V.N., Mugu R.R. Improvement of the JSC «Severnye Magistralnye Nefteprovody» staff competence and awareness in the field of environment protection and environmental management *Science & Technologies: Oil and Oil Products Pipeline Transportation* Vol. 1 (2014). pp.91-93.

[12] Morgunov B. A., Bagin A. M., Kozeltsve M. L., Terentiev A. A. Problems of Environmental Safety of Russia in the Light of the “Green” Growth Concept *Ekologiya cheloveka [Human Ecology]* Vol. 4 (2017), pp. 3-11.

[13] Hojnik J., Ruzzier M., Manolova T. Eco-Innovation and Firm Efficiency: Empirical Evidence from *Slovenia Foresight and STI Governance*, Vol. 11, no 3, pp. 103–111. DOI: 10.17323/2500-2597.2017.3.103.111