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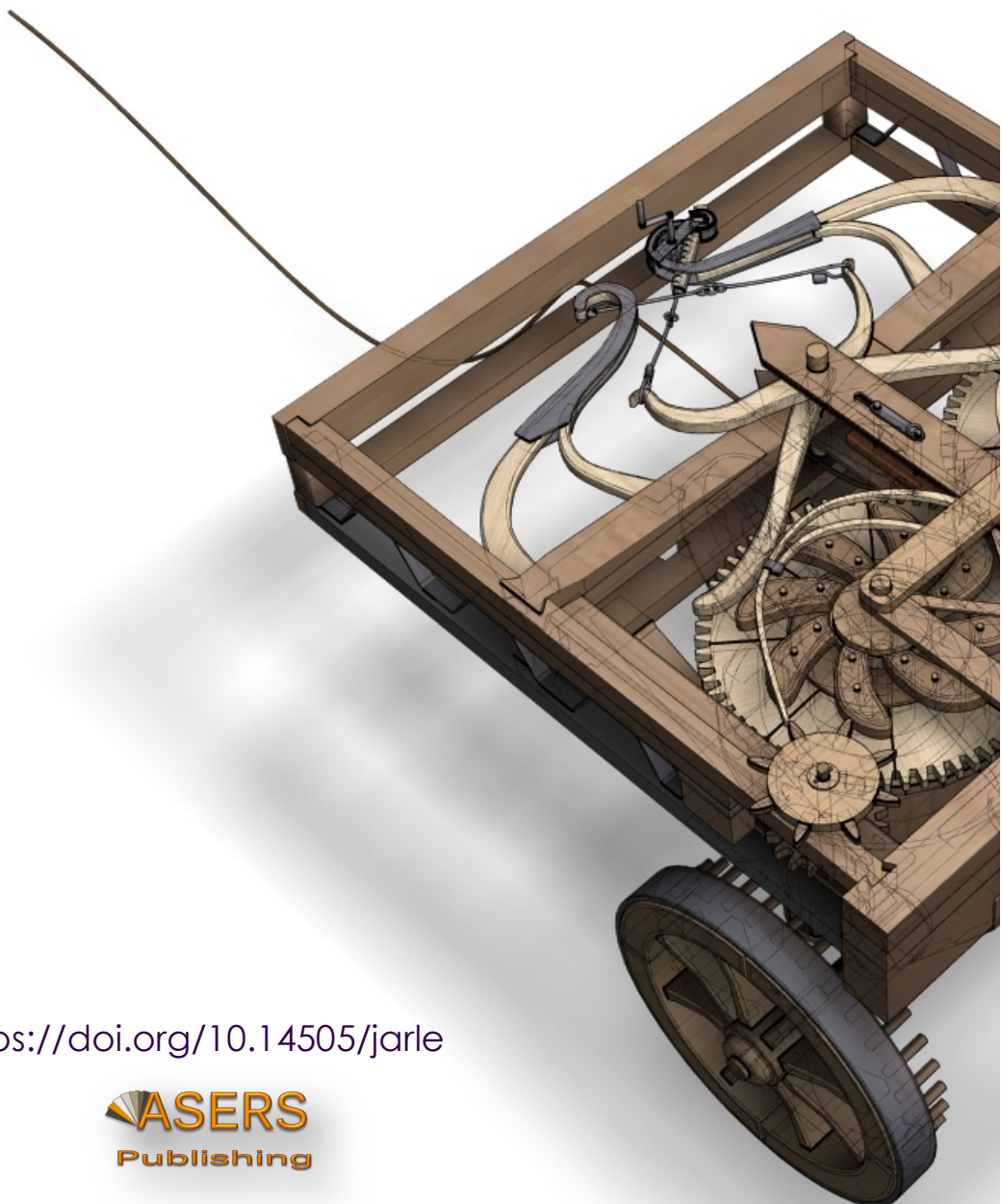
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Journal of Advanced Research in Law and Economics

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Fundamentals of Nuclear Safety State Management in Ukraine

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Abstract:

The object of the research is the relationships ensuring nuclear safety in Ukraine. The methodological basis of this study is modern general scientific methods and techniques of cognition, scientific theories about the state and law, the organization of public administration, development in the field of philosophy of law, public administration, administrative law and process, sociology. The work uses dialectical, structural-functional, historical, comparative-legal, system-structural and other methods. The purpose of this research is to characterize the measures provided by the national legislation of Ukraine for ensuring nuclear safety, which are carried out by authorized state bodies and officials. To achieve this purpose, the following tasks are set: to define the content of the concepts of 'national security' and 'nuclear safety', elements of the mechanism of management in the nuclear sphere; to allocate legal bases for ensuring nuclear safety and authorized entities; to carry out an analysis of the control system for nuclear safety in Ukraine; to characterize the research activity and international cooperation of Ukraine in the nuclear sphere; to characterize administrative services in the nuclear sphere; to investigate the activities of the governing body on the management of nuclear power plants in Ukraine – the State Enterprise National Nuclear Energy Generating Company 'Energoatom'.

Keywords: nuclear safety management; nuclear control; administrative services of Ukraine; nuclear power plants.

JEL Classification: K00; K32; K19.

Introduction

Protecting the rights, freedoms and security of the population in every modern country is the basis for carrying out a complex of measures in various spheres of public life and activity. Part of the relationship to ensure national security in Ukraine is related to nuclear safety. In general, there are three groups of reasons that have an impact on the nuclear security relationship in Ukraine: (1) nuclear disarmament and the acquisition of a nuclear-free status; (2) peaceful use of the atom (organization of organization of activity and functioning of nuclear power plants; (3) Chernobyl catastrophe and its consequences, taking measures to ensure the safety of the population from the negative impact of the atom.

The article covers issues on organization of control in the field of nuclear regulation, international cooperation in the field of nuclear safety; research activity in the field of nuclear energy use, activities related to the organization of internal management of nuclear power plants (in particular, activities of a State Enterprise National Nuclear Energy Generating Company 'Energoatom'). Therefore, research of the state administration in the field of nuclear safety is relevant.

1. The Concept of Nuclear Safety and State Management in this Area

A simple generic definition is that 'safety' means 'the absence of unwanted outcomes such as incidents or accidents', hence a reference to a condition of being safe (Hollnagel 2014). Management in the field of nuclear safety in modern conditions should be based on the integration standards of the management system (Beckmerhagen *et al.* 2003).

Management activity in the field of nuclear safety in the modern system of Ukrainian administrative law refers to a special part as an Atomic Law (Gritsenko *et al.* 2015), and is also considered as institute of national security management.

In general, the definition of 'national security' is legally enshrined in the Law of Ukraine 'On the Foundations of National Security of Ukraine' (On the Foundations of National Security of Ukraine 2003). Using the provisions of this law by analogy, one can determine nuclear safety as the protection of vital interests of man and citizen, society and the State, timely detection, prevention and neutralization of real and potential threats to national interests in the field of nuclear activity (Adamovichev *et al.* 2017). The legislation of Ukraine defines the radiation safety as an observance of permissible limits of radiation exposure to personnel, population and the environment, established by norms, rules and safety standards (On the Use of Nuclear Energy and Radiation Safety 1995).

According to the Ukrainian legislation, the subjects of ensuring the national safety (and hence nuclear safety) are: the President of Ukraine; Verkhovna Rada of Ukraine; the Cabinet of Ministers of Ukraine; National Security and Defense Council of Ukraine; ministries and other central executive bodies; the National Bank of Ukraine; courts of general jurisdiction; Prosecutor's Office of Ukraine; National Anti-Corruption Bureau of Ukraine; local state administrations and local self-government bodies. Special powers in the field of nuclear safety are endowed by central executive authorities.

Security activities are closely linked to management in this area. In the analysis, one can distinguish the following components of the mechanism of nuclear safety management:

- appropriate legal regulation, implementation of the established legal norms and monitoring of problems of law enforcement;
- presence of authorized subjects of management activity in the field of nuclear regulation (both general and special competence);
- the existence of measures of influence on the part of the authorized agents on the objects of management (training measures, prevention, suspension, liability, promotion, control, etc.);
- the presence of 'feedback', that is, the methods of verification by subjects of relations in the field of nuclear safety, quality, efficiency, optimality, and the effectiveness of management in this area.

Nuclear Safety Management covers the following groups of relationships:

- (1) Organization of control in the field of nuclear regulation;
- (2) Organization of civil protection and management of territories affected by the Chernobyl disaster;
- (3) International cooperation in the field of nuclear safety; research activity in the field of nuclear energy use;
- (4) Activities related to the organization of internal management of nuclear power plants (in particular, activities of a State Enterprise National Nuclear Energy Generating Company 'Energoatom').

It is necessary to analyse these relationships in details.

2. Control in the Field of Nuclear Safety

Issues concerning state control in the nuclear sphere are relevant from the 2nd half of the 20th century (Camilleri 1984). Control in the field of nuclear safety at the internal management level is functionally assigned to a specially created executive body – an inspection, the activity of which is directed and coordinated directly by the Cabinet of Ministers of Ukraine (On optimization of the system of central executive authorities 2014). The State Nuclear Regulatory Inspectorate of Ukraine (hereinafter referred to as the SNRIU or Inspection) is the central executive body and ensures the formation and implementation of state policy in the field of nuclear safety use (On Approval of the Regulations on the State Nuclear 2014). The SNRIU in its activities is guided by the Constitution of Ukraine (The Constitution of Ukraine 1996) and laws of Ukraine, decrees of the President of Ukraine and resolutions of the Verkhovna Rada of Ukraine, adopted in accordance with the Constitution and laws of Ukraine, acts of the Cabinet of Ministers of Ukraine, and other legislative acts. The Inspection is headed by a chairman appointed to office and dismissed from office by the Cabinet of Ministers of Ukraine upon submission of the Prime Minister of Ukraine.

Structure
30 October 2017

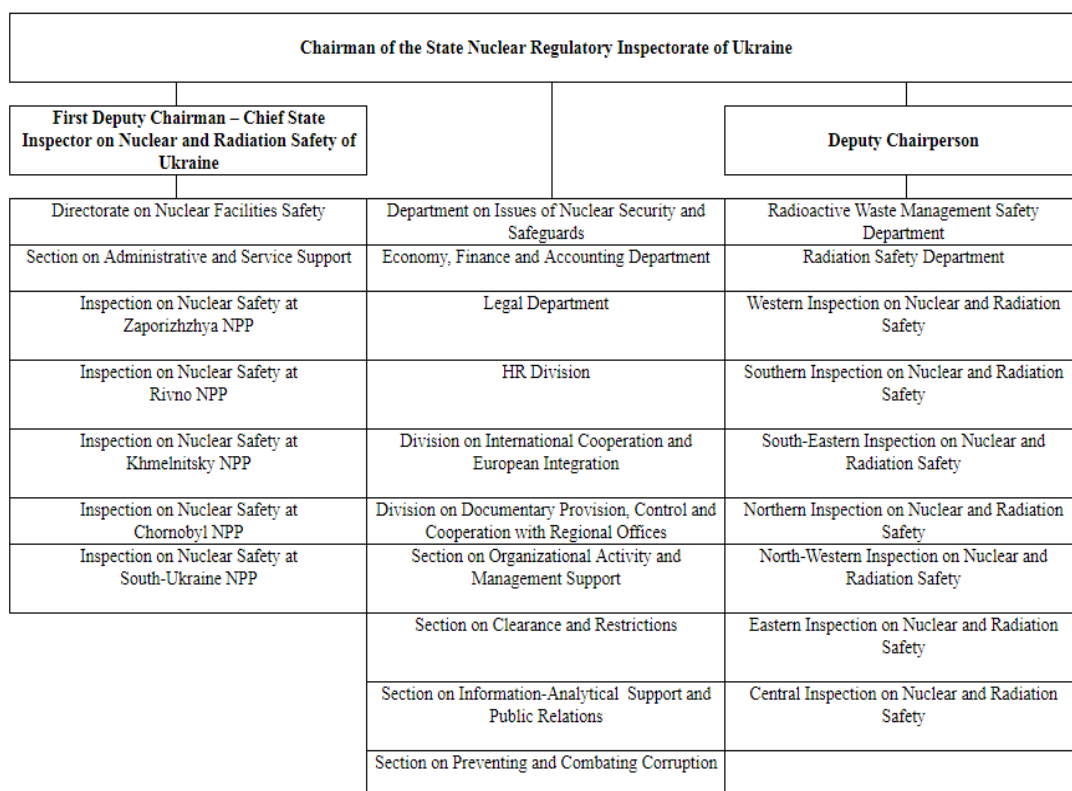


Figure 1. The structure of the State Nuclear Regulatory Inspectorate of Ukraine

The main tasks of the SNRIU are:

- ensuring the formation and implementation of state policy in the field of safety of nuclear energy use;
- implementation of state regulation of safety of nuclear energy use;
- exercise of the authority of the competent body for the physical protection of nuclear material and nuclear facilities in accordance with the Convention on the Physical Protection of Nuclear Material (Convention on the Physical Protection of Nuclear 1979); on the safe transportation of radioactive materials in accordance with the rules of nuclear and radiation safety in the transportation of radioactive materials; on alert and notification issues under the Convention on Early Notification of a Nuclear Accident (Convention on Early Notification of a Nuclear Accident 1986).

The SNRIU exercises its powers directly and through territorial bodies established in the specified order. During the execution of the tasks assigned to it, it interacts with other state bodies, subsidiary bodies and services created by the President of Ukraine, temporary advisory, consultative and other subsidiary bodies formed by the Cabinet of Ministers of Ukraine, local self-government bodies, citizens' associations, public unions,

trade unions and employers' organizations, relevant bodies of foreign states and international organizations, as well as enterprises, institutions and organizations.

The Inspection carries out informative activities of a general nature, in particular generalizes the practice of applying legislation on nuclear activities; develops proposals for its improvement, prepares draft legislative acts, acts of the President of Ukraine and the Cabinet of Ministers of Ukraine and, in the established manner, submits them for consideration by the Cabinet of Ministers of Ukraine.

The SNRIU coordinates the activities of central and local executive authorities, which are legally responsible for ensuring nuclear and radiation safety, reviews the appeals of citizens on issues related to its activities, performs functions related to the management of state-owned objects belonging to the authority.

The control activity includes approval the procedure of conducting inspections and inspection examination; the control over the temporary storage of radioactive wastes by their producers exceeds the established terms of the license of the lines.

The Inspectorate is empowered to use the legal measures foreseen by law to legal entities and individuals in case of violation of their legislation, the conditions of issued documents of permissive nature, norms, rules and standards on nuclear and radiation safety, requirements for the physical protection of nuclear facilities, nuclear materials, radioactive waste, other sources of ionizing radiation, accounting and control of nuclear materials and other sources of ionizing radiation.

Also, the Inspection issues binding orders (prescriptions) for elimination of violations and shortcomings in the field of safety of nuclear energy use; a submission about the inconsistency of individual persons with the positions occupied.

The Inspection may apply financial sanctions to enterprises, institutions and organizations and other business entities in case of violation of legislation in the established procedure. Such sanctions are:

- restriction, termination, stopping of operation of enterprises, institutions, organizations, nuclear facilities, objects intended for radioactive waste management, installations with sources of ionizing radiation in case of violation of requirements of nuclear and radiation safety or failure to comply with such requirements;
- removal of personnel from the activities related to the direct management of the reactor plant and officials of the operating organization from the performance of official duties for the implementation of organizational and regulatory functions related to the provision of nuclear and radiation safety in case of violation of their legislation, conditions of issued documents of permissive character, norms, rules and standards on nuclear and radiation safety, requirements of physical protection of nuclear facilities, nuclear materials, radioactive substances wastes, other sources of ionizing radiation, accounting and control of nuclear materials and other sources of ionizing radiation.

The head of the Inspection is empowered to bring to the disciplinary liability civil servants and employees of the apparatus, heads of its territorial bodies.

Direct supervision over observance of the legislation, conditions of issued permits, norms, rules and standards on nuclear and radiation safety, requirements of physical protection of nuclear facilities, nuclear materials, radioactive wastes, other sources of ionizing radiation, accounting and control of nuclear materials and other sources of ionizing radiation is carried out by state inspectors of the SNRIU. They have the right to attend freely at any time the enterprises, institutions and organizations, regardless of the form of ownership, to carry out within the limits of their authority the corresponding inspections, as well as to have other rights prescribed by law.

For investigation and application of administrative or criminal responsibility, the inspection transmits to the law enforcement agencies acts of inspections of the violations found.

3. International Cooperation and Research Activities in the Field of Nuclear Energy Use

The field of security in the modern world requires a systematic approach by generalizing between systems and individual sources of danger (Rasmussen 1997).

The SNRIU organizes and conducts scientific research in the field of nuclear energy security; develops and carries out measures for the formation of a culture of safety in the use of nuclear energy and a culture of protection of nuclear installations, nuclear materials, radioactive wastes, and other sources of ionizing radiation; defines the criteria and safety requirements, the observance of which is mandatory in the use of nuclear energy.

The Inspection is a Ukrainian-owned representative of Ukraine at the international level in the field of nuclear safety and provides the exchange of information with the International Atomic Energy Agency on the illicit trafficking of radioactive materials and on the accumulation of radioactive waste in Ukraine, approves a list of documents and information necessary for radiological control at the border of Ukraine.

The SNRIU serves as the only national point of contact in accordance with the Convention on Early Notification of Nuclear Accident (Convention on Early Notification of a Nuclear Accident 1986), the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Convention on Assistance in the Case of a Nuclear 1986), and the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities (Convention on the Physical Protection of Nuclear 1979). The Inspection shall ensure and take measures to fulfill the obligations arising from Ukraine's membership in international organizations and commitments undertaken under international treaties on nuclear and radiation safety.

The Inspection organizes and coordinates the preparation of national reports on measures taken by Ukraine to fulfill the obligations under the Convention on Nuclear Safety (Convention on Assistance in the Case of a Nuclear 1986), the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention on the Safety of Spent 1997), other international treaties, and within its competence approves such reports and submits them to the relevant international organizations. It carries out an international exchange of operational information on nuclear events within the framework of the international scale of nuclear events.

The Inspectorate coordinates the interaction of executive authorities with the International Atomic Energy Agency and other international organizations engaged in activities in the field of nuclear and radiation safety.

The SNRIU manages the creation and operation of the sub-system on safety issues of nuclear facilities included in the single state civil protection system. To this end, approves the procedure for conducting training and verification of knowledge, verifies knowledge on nuclear and radiation safety issues for personnel and officials who provide nuclear and radiation safety, subjects of activity in the sphere of nuclear energy utilization that is subject to state regulation.

The Inspectorate prepares an annual report on the state of nuclear and radiation safety in Ukraine, relevant reports and reviews, and submits them to the Verkhovna Rada of Ukraine, the President of Ukraine, the Cabinet of Ministers of Ukraine, other bodies of state power, as well as local self-government bodies, public associations; promptly informs the mass media about radiation accidents on the territory of Ukraine, as well as abroad, in the event of a transboundary transfer of radioactive substances. It accepts on the basis of information about the safety of a nuclear vessel that intends to enter the territorial sea of Ukraine, a decision on its entry into the territorial sea or on the prohibition of such an entry; informs the public about the development and implementation of the state policy on the safety of nuclear energy use.

The Inspection establishes rules on radiation safety during the handling of scrap metal; carries out state supervision over observance of the legislation, conditions of issuance of permits, norms, rules and standards on nuclear and radiation safety, requirements of physical protection of nuclear facilities, nuclear materials, radioactive wastes, other sources of ionizing radiation, rules of accounting and control of nuclear materials and other sources of ionizing radiation, etc.

Orders of the Inspection, which are regulatory acts in accordance with the law, are developed, considered, adopted and public in accordance with the requirements of the Law of Ukraine 'On the Principles of State Regulatory Policy in the Field of Economic Activity' (On the Principles of State Regulatory 2003).

The interaction of SNRIU with international institutions is carried out through the conclusion of administrative agreements (cooperation agreements), for example with the EU. The European Union contributes to the financing of following projects within the framework of the 'Annual Nuclear Safety Action Program 2010 – Part II' (Instrument for Nuclear Safety Cooperation):

- Project U1.05/10: Joint Program in the field of nuclear safety, aimed at increasing operational efficiency, observance of safety standards and efficiency of using the personnel potential of 'Energoatom' and its nuclear power plants;
- Project U4.01/10: Support for implementation of the program on radioactive waste management in Ukraine;
- Project U3.01/10: Assist the State Nuclear Regulatory Inspectorate of Ukraine in resolving issues related to the safe management of radioactive waste and harmonization of regulatory requirements for nuclear and radiation safety (Agreement on financing of the annual nuclear safety action program 2010).

4. Administrative Services in the Nuclear Field

The administrative services of the Inspection should include the provision of permit documents. The types of permits are: license, permit, certificate, opinions (conclusions), approval of the licensing activity, coordination.

Licensing is carried out in respect of:

- activity of the operating organization at a separate stage of the life cycle of a nuclear installation or a storage facility for the disposal of radioactive waste;
- activities related to the direct management by the personnel of the reactor plant;
- activities of officials of the operating organization, whose duties include the exercise of organizational and regulatory functions related to the provision of nuclear and radiation safety;
- uranium ore processing, processing and storage of radioactive waste, use of sources of ionizing radiation, production of sources of ionizing radiation, transportation of radioactive materials;
- training of personnel for the operation of a nuclear installation (in the list of positions and specialties determined by the Cabinet of Ministers of Ukraine);
- training, retraining and professional development of specialists in the physical protection of nuclear facilities, nuclear materials, radioactive waste, and other sources of ionizing radiation.

Certificates are provided in case of transportation of radioactive materials. Permissions are granted for:

- transportation of radioactive materials in case of their international transportation;
- performing certain types of work or operations at the stages of construction, commissioning, operation and decommissioning of a nuclear installation, operation and closure of a storage facility for the disposal of radioactive waste.

Conclusions are given regarding:

- compliance with the requirements of nuclear and radiation safety and physical protection in the case of export, import, temporary export, temporary import, re-export and transit of radioactive materials that can be used in the creation of nuclear weapons;
- permits for the use of land and water located in the sanitary protection zone of a nuclear installation, an object intended to handle radioactive waste, uranium facility in agreement with the operating organization.

In addition to the issuance of permits, approval of the conditions and types of works or operations at the stages of construction, commissioning, operating conditions and decommissioning of the nuclear installation (including at certain stages of operation) and the closure of the storage facility for the disposal of radioactive waste are also carried out. The SNRIU:

- coordinates the acts of determining the level of physical protection of nuclear facilities, nuclear materials, radioactive wastes, other sources of ionizing radiation;
- agrees on the concept of decommissioning of nuclear facilities;
- provides managers of privately owned enterprises that use sources of ionizing radiation with the admission to the execution of special works; approves the procedure for recording radioactive waste;
- records sources of ionizing radiation;
- carries out the order of license forms for carrying out activities in the field of nuclear energy use and approves the procedure for their registration and storage;
- provides organization of creation and functioning of a unified state system of control and accounting of individual doses of radiation of the population;
- submits to the bodies of the state fiscal service the lists of enterprises, institutions, organizations, individuals – subjects of activity in the field of nuclear energy use, as a result of which the radioactive waste has been formed or can be formed and temporarily retain such waste beyond the specific conditions of the license the term agrees to report on the actual volumes of radioactive waste generated in the base tax (reporting) period, calendar quarter, and the actual amount of radioactive waste that comes from are kept by the manufacturer of such waste in excess of the stipulated terms of the license;
- keeps a state register of nuclear materials;
- ensures the fulfillment of Ukraine's obligations under the Agreement between Ukraine and the International Atomic Energy Agency on the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons, the Additional Protocol to the Agreement.

The legal and organizational principles of licensing activities in the area of nuclear energy use, as well as the general provisions governing the regulation of public relations, which arise during its conduct, are determined by the Law of Ukraine 'On Permits for the Use of Nuclear Energy' (On Permits in the Field of Nuclear Energy Use 2000).

Permitting activities in the field of nuclear energy use are aimed at protecting the interests of national security, preventing excessive standards of human exposure and environmental pollution, as well as compliance with the requirements of the non-proliferation regime.

The purpose of licensing activities in the field of nuclear energy use is:

- ensuring the use of only those nuclear facilities, sources of ionizing radiation, objects intended for the treatment of radioactive waste, uranium objects, the level of nuclear and radiation safety which has been recognized as meeting international requirements on the basis of a comprehensive assessment of all factors affecting on security, including physical protection;
- ensuring the carrying out of activities in the field of nuclear energy use only by natural and legal persons that can guarantee compliance with the requirements of legislation, norms, rules and standards on nuclear and radiation safety, physical protection of nuclear materials, nuclear installations, radioactive waste, and other sources of ionizing radiation.

The conditions for obtaining, legal regulation and other information about each of the administrative services are reflected in the information card of the respective administrative service.

5. State Enterprise National Nuclear Energy Generating Company 'Energoatom'

A separate area of management in the nuclear sphere is the organization of the activity of the State Enterprise National Nuclear Energy Generating Company 'Energoatom' (hereinafter – 'Energoatom' or company). The management system in the field of nuclear safety depends on many factors, including the culture of personnel safety and the management style of the company (Lee and Harrison 2000).

Energoatom in accordance with the current legislation (in accordance with the Decree of the Cabinet of Ministers of Ukraine dated 17 October 1996, No. 1268 'On the Establishment of the National Atomic Energy Generating Company 'Energoatom' (On the Establishment of the State Enterprise..1996)) is designated as the operating organization (operator) of nuclear facilities at the industrial sites of Zaporizhzhya NPP, Rivne NPP, Khmelnytsky NPP and South-Ukrainian NPP.

It is the operator of four existing nuclear power plants in Ukraine, which operates 15 nuclear power units. The main objective of 'Energoatom's activity is to increase the production of electricity and the utilization rate of the installed capacity of the NPP provided that the level of safety of the operation is constantly increased. The company provides about 55% of Ukraine's electricity demand; this indicator reaches 70% in the autumn-winter period.

Ukraine has the seventh place in the world in terms of installed capacity of nuclear power plants. 'Energoatom' is a member of WNA, INPRO, the Ukrainian Nuclear Society and the Ukrainian Nuclear Forum.

Exploitation of nuclear power plants in Ukraine is carried out in accordance with the requirements of the Laws: on the Use of Nuclear Energy and Radiation Safety (On the Use of Nuclear Energy and Radiation Safety 1995), on Protection of Human Rights against Ionizing Radiation (On protection of the person from the influence 1998); the Sanitary Rules for Providing Radiation Safety (On approval of state sanitary rules 2005), and others. The purpose of the current legislation in this area is to determine the basic requirements for health protection from possible harm associated with irradiation of sources of ionizing radiation, requirements for safe operation of the nuclear power plant, as well as requirements for environmental protection.

In accordance with the Law of Ukraine on the Use of Nuclear Energy and Radiation Safety (On the Use of Nuclear Energy and Radiation Safety 1995), 'Energoatom' has the functions of an operating organization responsible for safe production of electricity.

In addition, the main purpose of the Company's activities is to produce electricity, to ensure the safe operation of nuclear power plants, to improve the energy supply of the national economy and to the population, to increase the efficiency of the operation of nuclear power plants, and, within its competence, to ensure Ukraine's continued readiness for quick and effective action in the event of accidents at enterprises of nuclear power engineering, radiation accidents in industry.

Enterprise 'Energoatom' is based on state ownership and belongs to the management of the Ministry of Energy and Coal Industry of Ukraine (property management body).

The directions of activity of the Company in the field of nuclear energy use are: (1) the design of nuclear facilities or storage facilities for the disposal of radioactive waste; (2) transportation of radioactive materials; (3) processing, storage of radioactive waste; (4) storage, maintenance of sources of ionizing radiation; (5) use of sources of ionizing radiation; (6) training of personnel for the operation of a nuclear installation (in the list of positions and specialties determined by the Cabinet of Ministers of Ukraine); (7) designing a nuclear installation; construction of a nuclear installation after a comprehensive analysis of all aspects of security in the relevant project; (8) activities related to the physical protection of nuclear materials and nuclear facilities (in the list of activities approved by the Cabinet of Ministers of Ukraine), etc.

Conclusions

State management in the field of nuclear safety, taking into account the current level of development of methods for regulating administrative relations, had to be based and further developed on the basis of:

- the use of modern international legal standards and national peculiarities in the process of improving the legal regulation and improving the efficiency of the implementation of legal norms in the field of nuclear safety;
- improvement of the procedure for the activities of specially created nuclear power management bodies;
- development of new and improvement of existing means of protection of the population against radiation exposure, organization of research in the field of neutralization of negative influence of radioactive substances;
- use of an integrated approach in the field of utilization, ensuring the safety of radioactive waste in compliance with environmental legislation;
- improvement of the (automated) control system for the use of nuclear energy, which should be aimed at ensuring safety and efficiency without impeding the management of the nuclear field in Ukraine.

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