CONTEMPORARY CHALLENGES AND THREATS TO THE SECURITY OF INTERNATIONAL AND NATIONAL SOCIO-ECONOMIC DEVELOPMENT OF EURASIAN COUNTRIES

Review Article

DOI: 10.5937/zurbezkrim2302009Z	COBISS.RS-ID 139586305	UDK 351.74/75(4+5):339.923(4-672EU)

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Abstract: The uncontrolled, destructive development of civilization has sharply sharpened contemporary global world contradictions, primarily interstate and intrastate relations, society's attitude toward the environment, the violation of the sovereignty of independent states under the pretext of "peacemaking and world security," etc. Experts are alarmed by a growing number of various challenges and threats (geopolitical, food, demographic, climatic, ecological, raw material, energy, etc.) and natural and technogenic emergency situations, the constant improvement of scenarios and methods of terrorist activity, unforeseeable political, socio-economic, ecological and other consequences that hinder the organization and execution of rescue and humanitarian operations, and the sustainable development of countries. Among the possible means of terrorist activity, terrorist acts using "dirty bombs" and biological agents are regarded as the most dangerous due to their medical, biological and socio-psychological consequences.

Keywords: national security, economic activity, natural and technogenic emergencies, terrorism, dirty bomb.

INTRODUCTION

Comprehensive problems that have arisen before humanity are described as a result of the deformed, destructive development of civilization with com-

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plex and diverse forms and types of dangers. The process of forming a new polycentric model of the world order is accompanied by the growth of global and regional instability. The contradictions associated with an uneven world development, the widening gap between the levels of prosperity of countries, the struggle for resources, access to markets and control over transport networks have intensified. Competition between countries now includes basic values and models of social development, human, scientific and technological potential. The support of the USA and the European Union to the unconstitutional coup d'état in Ukraine led to a deep split in Ukrainian society, the international community, and an armed conflict and instability in Europe, in the immediate vicinity of the borders of the Russian Federation.

The growing international conflict potential, the illusory perspective of changes in the hostile course of Russia's traditional geopolitical opponents require the development of a long-term policy for national security, a sustainable socio-economic development, a proper assessment of the strategic risks of large investment projects that are implemented in developing regions, but which are subject to regular, unforeseeable impacts of consequences caused by the increasing intensity and scale of global climate and environmental changes, various unforeseen circumstances, crises, emergency situations [ES], terrorist acts, which have different scenarios and use different means (*Figure 1*). The main approaches to the strategic planning of the state system for the prevention and liquidation of emergency situations in the Russian Federation are aimed at ensuring the following: international humanitarian operations; integrated socio-economic sustainable development national projects; the ecological security of economic activity; the mitigation of the impact of emergency situations; the reduction and prevention of terrorist activity; the improvement of forces and means for early warning of threats; and the efficient interaction between rapid response teams. The growing military threat posed by NATO contributes to the improvement of information sharing between the Ministry of Emergency Situations and the Russian Ministry of Defense, other key departments and organizations responsible for the fight against accidents, breakdowns, natural disasters, and organizing the fight against terrorism (the destruction of the North Stream gas pipeline), and civil defense (Зверьков et al., 2022: 60).

PROVIDING COMPREHENSIVE SECURITY TO THE STATE UNDER CONDITIONS OF HARMFUL AND DANGEROUS ENVIRONMENTAL FACTORS IMPACT

The problem of protecting the national security of states from external and internal dangers and threats, coalition ways of providing security to states are the dominant trend in contemporary international relations. In the unipolar world, new dangers and threats that affect the entire post-Soviet space and each country individually have arisen. Due to the growing threat aimed to destabilize

new states and territories, the integration of the efforts of states to protect their interests in the field of military security on a multilateral and bilateral basis is visible in almost all the countries of the world. In the post-Soviet space, the desire of the USA, Germany, Sweden, Turkey, Iran, and China to include some countries in their sphere of influence is obvious. Potential sources of military danger were formed along the entire perimeter of the borders of the Commonwealth of Independent States (CIS), under the impact by various factors that turned into a direct military threat, which, in different regions, assumes an interregional character different in time, place and scale. The group of troops (forces) in the areas along the external borders of the CIS are being formed to the extent that they violate the existing parity of forces; the organization of border conflicts and armed provocations by the neighboring countries; the creation and training of armed formations in other states intended for use against the CIS; the engagement of foreign troops in the neighboring territories of the CIS, which are not related to measures for peace restoration and maintenance in accordance with the decision of the UN Security Council. There are also territorial claims among the member states of the CIS.

The growing threat of new regional conflicts or the expansion of ongoing ones leads the leadership of certain countries to achieve political and military goals by using weapons of mass destruction. Using the created technological and production base, accumulated resources, some of them have obtained nuclear weapons and the means for their delivery (Israel, India, Pakistan, Iran, North Korea), while others are making efforts to solve this problem, increasing the risk of nuclear proliferation, which contributes to the emergence of new conflict hot spots and activates smoldering inter-national, inter-ethnic, inter-religious contradictions, organized crime, drug trafficking, refugee migration flows, environmental problems, the spread of epidemics and famine. The fight against international terrorism has become a global problem (Усиков et al., 2009: 14; Зверьков et al., 2022: 60).

Figure 1. A variant of the classification of the main contradictions and conflicts in the process of the development of civilization by type of solution

Due to increasing danger, the CIS naturally strives for integration in the military domain, the preservation of the common historically formed geostrategic and economic space, cultural, linguistic and other traditional ties. Many post-Soviet countries do not have a sufficient military-industrial base for the production of the necessary weapons and military equipment, but they have modern production capacities for the production of components, such as aggregates, components, devices, control systems, and so on. All of the above predetermines the greater cooperation of the CIS in encouraging cooperation in the creation and production of weapons. Collective security systems formed in cooperation with international organizations and regional security structures can become an effective factor of stability and security in the Eurasian region and the world, a link in the multi-level global security system between the West and the East, the North and the South, in the 21st century.

PROBLEMS FACED BY THE ELECTRIC POWER INDUSTRY – THE MOST IMPORTANT COMPONENT OF NATIONAL SECURITY

The Russian Federation has the largest territory in the world, which is extremely unevenly populated, with an unequal degree of economic development of the region. About two-thirds of its surface is outside the zone of centralized electricity supply: remote, sparsely populated areas, which are strategically important due to their large mineral wealth. Siberia occupies 57% of Russia's territory with 15% of the country's population, mainly along the Trans-Siberian Railway. Over 90% of produced gas, 70% of oil reserves, 50% of wood resources, large non-ferrous and rare metals resources, and chemical raw materials can be found in its northern, sparsely populated macro-regions. The remote, hard-to-reach regions of Far North, Siberia and Far East have an autonomous electric power industry. The operation of numerous outdated power plants and boiler plants on diesel and fuel oil with different equipment is associated with significant organizational difficulties in the delivery of fuel and spare parts during the northern delivery, an increase in unforeseeable costs for their procurement and transportation when a river must be navigated rapidly. Under difficult natural conditions, traditional energy sources and fuels based on renewable sources cannot meet the economic and environmental requirements imposed by the growing heat and electricity demands. The problems related to the environmental responsibility for the condition of unapproachable territories contaminated with industrial waste, used blocks and spare parts, and fuel and chemical storage containers have intensified. The growing shortage of heat and electricity faced by these territories threatens the industry development plans and increases the outflow of population due to poorly solved problems related to a comfortable life and reduces the country's ability to defend itself. Solving the

problem by setting up new networks is not, in most cases, economically feasible or impossible due to terrain conditions, long distance, and consumer decentralization (Саркисов, 2014: 7).

POSSIBLE PRINCIPLED SOLUTION

A radical solution to this problem can be the widespread introduction of low power nuclear power plants (NEMS): floating, portable and stationary. The most promising, mass-produced compact mobile nuclear units of modular design with full factory readiness can work without overloading the active zones for up to 20-30 years, with subsequent shipment to places of traffic. Considering the difficult and expensive northern delivery for remote regions, NEMS can become the basis of energy for industrial development and maintenance of the social sphere. Preliminary estimates indicate that the total need to cover electricity and heat deficit at the expense of NEMS for the period up to 2030 for the northeast of the country amounts to about 20 GV (200-2000 units with a capacity of 10-100 MW). The practical implementation of this direction can be achieved if there is a reasonable idea to create a NEMS system as the basis of the regional electric power industry in the state strategy for energy supply in the regions that are not included in the unified energy system, allowing them to fully achieve the main advantages:

- Minimizing the scope and cost of capital construction in the regions where the nuclear power plants are situated. The cost of installation and commissioning of a NEMS are minimized because high-tech, expensive and complicated operations are transferred to specialized factory workshops that have qualified personnel;
- Possibility of transferring the most dangerous nuclear and radiation operations related to repair and the transshipment of fuel from the deployment location to specialized factory workshops, ensuring a high level of procedural safety;
- Significantly simplified problems related to the decommissioning of these nuclear power plants after the end of their working life;
- minimized ecological consequences for the environment;
- Possible use of a small number of employees on a rotational basis.

The installation of low-power nuclear sources in a certain region should be the result of a comprehensive analysis of the benefits and cost related to their operation, determining the needs of the region based on their economic situation and development prospects (*Figure 2*). The type of low-power nuclear source chosen should be appropriately justified in terms of economic efficiency, nuclear and environmental safety and other determining factors of national security (Шадрин, 2011: 101). The use of low-power nuclear sources requires solving a number of problems related to the non-proliferation of nuclear mate-

rials, ensuring nuclear and radiation safety, the training of personnel, the development of a special legal framework, combating terrorism, and so on. Unfortunately, despite the huge economic potential and strategic importance for the development of Far North, Siberia, and Far Eastern regions, a unique concept and program for decentralized energy supply in the regions in the Russian Federation has not been fully developed (Саркисов et al., 2018: 5). Russian science and industrial production complex currently offer a number of measures to overcome the risk of "radiation." Some of them are analyzed in more detail in the following sections.

EXPERIENCE IN ELIMINATING THE CONSEQUENCES OF EMERGENCY SITUATIONS

Long-term experience with eliminating the consequences of emergency situations at radiation facilities enabled the reduction of the level of radioactive contamination of the region implementing the following (Зверьков et al., 2022: 60; Саркисов, 2014: 7):

- Improving the regulatory framework of the sector;
- Increasing the efficiency of the research phases (the reconnaissance of the area, the identification and delineation of the boundaries of the area of radioactive contamination, subsequent work on decontamination, the storage of contaminated materials in specific storage facilities);
- Minimizing the exposure of the population living near the zone of radioactive contamination to the consequences of the accident;
- Applying automated methods for monitoring the radiation and environmental situation at the locations of radiation-hazardous factories and facilities;
- Using modern portable and precision instruments, equipment, auxiliary engineering and technical equipment to increase efficiency, reduce work cost.

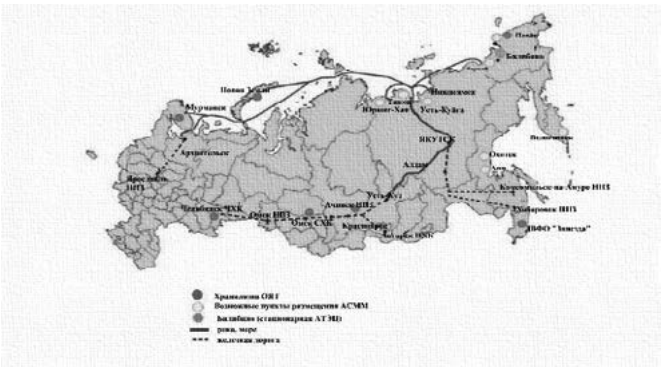

Figure 2. Possible options for the installation of a NEMS in Russia

MEDICAL AND SOCIO-PSYCHOLOGICAL ASPECTS OF RADIATION TERRORISM

Taking into account a rather strict protection of nuclear-dangerous objects, experts, describe radiation terrorism as the uncontrolled spread of ionizing radiation sources in the environment – much more likely than nuclear (Kuna et al., 2007: 52). Theoretically possible scenarios for the use of radioactive materials [RM] are the following:

- Sabotage at facilities where there is a risk of radiation (nuclear power plants, ships with nuclear power plants, research and medical facilities with ionizing radiation sources [IRS], etc.);
- Drinking water or food contamination;
- Producing a "dirty bomb" to be activated in a densely populated area. The technological simplicity of making a "dirty bomb", the prevalence and availability of RM in science, technology and medicine are the reason for a constant threat posed by radiation terrorism, which is aimed at spreading fear of food and water contamination, environmental components with radionuclides contamination among the population, and generating panic, and social and economic destabilization of societies (Ильин et al., 2008: 11; Kuna et al., 2009: 85; Kankova, 2006: 128).

KEY FACTORS OF POTENTIAL DANGER FROM RADIATION

The prevalence of these sources in various sectors of the economy (industry, agriculture, medicine, autonomous energy sources), the problems of their registration, licensing, regulation, control and suppression of the possibility of illegal movement, especially in the non-nuclear industry, the relative simplicity of making "dirty radioactive bombs" and the means of their delivery represent the key factors that determine the degree of potential danger from IRS for the purposes of radiological terrorism. According to data of the Nuclear Regulatory Commission of 2007, the USA used over 53,700 registered potentially most dangerous IRS of types 1 and 2 in various areas. The radioactive substances likely to be used in terrorist attacks are Cobalt-60, Strontium-90, Cesium-137, Iridium-192, Americium-241, and Californium-252 (Kankova, 2006: 128); (Levett, 2007: 346). According to the United Nations Scientific Committee on the Effects of Atomic Radiation [UNSCEAR], there are more than 10,000 radiation therapy units with Cobalt-60, several hundred with Cesium-137, sources for industrial radiography (80% with Iridium-192, the rest with Cobalt-60, Sele-

nium-75 and Ytterbium-169), for fire protection and oil exploration (based on Americium-241), more than 300 industrial irradiators containing combinations of emitting radionuclides. According to IAEA data, 441 reactors in nuclear power plants and 231 research reactors were operating in 56 countries across the world at the beginning of the 21st century (450 reactors were closed, decommissioned and/or under construction). Their spent nuclear fuel is perfect material for terrorists. Radioisotope thermoelectric generators [RTG] are dangerous constructive autonomous sources of electricity in artificial Earth satellites, space probes, automatic beacons and meteorological stations. Over 900 RTGs with an activity of 45 Mcuries of strontium-90 and were produced in Russia (Chin, 2007: 950; Гребенюк & Сидоров, 2012: 11).

The execution of radiation terrorism acts by antisocial elements involves various methods used to spread RM and their impact on the contingents (Kuna et al., 2009: 85; Chin, 2007: 950). A dirty bomb is a combination of ordinary explosives, such as dynamite, with radioactive dispersed/non-dispersed materials (liquid and/or powder) packed around an explosive core (Kankova, 2006: 128; Фалеев & Цыбиков, 2019: 339). Damage caused by a dirty bomb is directly related to the explosive contamination of people or the environment with radioactive materials, causing limited damage, direct or indirect damage to human health, the natural environment, social and economic spheres, with a strong psychological effect (Chin, 2007: 95; Фалеев & Цыбиков, 2019: 339; Ring, 2004: 42). By using highly active sources to achieve significant psychological and biomedical effects, terrorists themselves are exposes to great danger. Basic care for one's own health and life prevents radiation terrorism: bulky lead protection makes it difficult to assemble and transport dirty bomb devices, weak protection exposes terrorists to radiation risks (Гребенюк & Сидоров, 2012: 11; Ring, 2004: 42). The improper storage of radioactive materials and the fact that radioactive materials are available in medical, educational, scientific and industrial institutions generate prerequisites for their abduction by various types of criminals. In the USA, on average, 200-375 radioactive sources are lost and/or stolen on a yearly basis, which is a similar situation in other industrialized countries in the world (Kuna et al., 2009: 85; Арутюнян, 2004: 38). The Ministry of Emergency Situations of the Russian Federation, the State Enterprise – MosNPO "Radon", and The Federal Service for Supervision of Use of Natural Resources (Rosprirodnadzor) confirmed the presence of various alpha, beta and gamma emitters (a total of 19 radionuclides) in the abandoned IRSs or in IRSs seized due to improper storage, which can be used to make a dirty bomb between 2004 and 2015.

PRIORITY DIRECTIONS PERTAINING TO MEASURES FOR THE PREVENTION AND ELIMINATION OF THE CONSEQUENCES OF NATURAL AND TECHNOGENIC DISASTERS

The consequences of global climate change still have unforeseeable impacts on natural and economic systems in Russia, which significantly affect the health of the population of this huge Eurasian country with diverse (geographical, climatic, ecological, economic, or demographic) conditions. At the end of the 20th and the beginning of the 21st century, there is a growing dangerous phenomena with catastrophic consequences, an increase in the number of emergency situations, terrorist activities and a growing impact of unfavorable and dangerous environmental factors (*Figure 3*), which exacerbate the problems related to the national security of the country (Цыбиков, 2018: 242). Through the implementation of the Yokohama Strategy and the UN Plan of Action for a Safer World, developed countries create early warning systems for timely warning and emergency notification. The sustainable development of Russia requires ensuring the stable functioning of the economic sector and improving the safety of the population against all kinds of challenges and threats.

In the area of technogenic, natural and ecological security, the distribution of responsibility between competent state structures with the coordinating role of the Ministry of Emergency Situations of the Russian Federation, it is advisable to organize the monitoring of the state of the environment and public health in a single integrated monitoring for the subsequent explanation of the agreed measures related to adaptation to negative impacts (Цыбиков, 2018: 242; Цыбиков, 2016: 52).

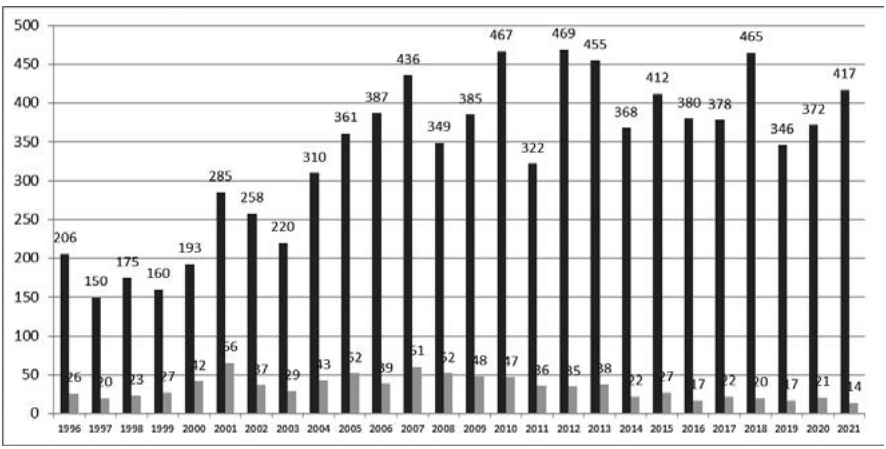

Figure 3. Distribution of hydro-meteorological dangerous phenomena by year: total number (blue), number of unforeseen dangerous phenomena (red).

It is desirable to create, improve and develop early warning systems for emergency situations based on the maximum use of the possibilities of existing systems for monitoring the state of the environment (atmosphere, hydrosphere, soil and vegetation, wildlife), technosphere objects, including the security of buildings, objects, critically important and potentially dangerous objects of the economy, traffic infrastructure. The technical basis of the early warning system in emergency situations should be preserved by land, air, and space observation and control. An analysis of the emerging situation must be carried out using modern geophysical information technologies, which enable real-time warning coupled with modeling methods for the possible development of emergency situations. It seems that the realization of the target functions of such integrated monitoring in Russia can be carried out by coordinating interactions regarding specific indicators of the distributed systems of key departments and organizations that are prioritized through their sectoral and territorial monitoring and forecasting systems (Арутюнян, 2016: 52; Сорокин et al., 2017: 63).

The creation of documents for the strategic development of the constituent entities of the Russian Federation showed an urgent need to take into account the constituent entities of the Russian Federation and the impact of extraordinary risks on the socio-economic development of the region, their investment attractiveness and the formation of a comfortable and ecologically safe environment. A variant of the simplified structure of the Unified State System for the Prevention and Elimination of Emergency Situations including the local level of government (municipality) is discussed in more detail by (Сорокин et al., 2017: 63). The decades-long practice of eliminating the consequences of emergency situations in Russia indicates an increase in the potential risk of accidents at potentially dangerous facilities and facilities of critical infrastructure along with the release of radiation, chemical and biological pollutants into the environment. The analyzed scenarios for the development of emergency situations at radiation facilities and problems related to the elimination of such situations, are, according to scholars, identical to the issues that are resolved for similar facilities in other economy sectors (Фалеев & Цыбиков, 2019: 65; Цыбиков, 2016: 52). The prevention of risks, among other things, to promising nuclear energy can be successfully achieved through integrated development planning of constituent entities of the Russian Federation and the member states of the CIS.

CONCLUSION

Society's wrong perception of the real consequences of radiation accidents, radiological terrorist attacks, direct and indirect damage to the population and the environment has historical and psychological roots (the nuclear arms race, the dramatic consequences of the atomic bombing of Hiroshima and Nagasaki). An ordinary man's radiophobia, wrong perception of radiation danger of the

majority of decision-makers at various levels of legislative and executive power, and contradictory and scientifically unjustified super-rigidity of the regulatory system in the field of radiation safety increase perception of the radiation factor. Due to the complexity of work on economically important facilities in the country, the problem of combating possible radiation emergency situations and terrorist attacks at the current stage and close cooperation between research and practical institutions in Russia and neighboring countries in solving these problems are extremely important (Арутюнян et al., 2004: 38; Фалеев & Цыбиков, 2019: 339).

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Paper received on: 5/6/2023

Paper accepted for publishing on: 10/10/2023