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Monograph review

Cybersecurity in nuclear energy: Challenges, regulations, and management models for Poland

Recenzja monografii

Cyberbezpieczeństwo w energetyce jądrowej: Wyzwania, regulacje i modele zarządzania dla Polski

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I embarked on the review of this monograph with great satisfaction. It addresses cybersecurity in nuclear energy, a challenge facing contemporary Poland and slated for implementation in our country by 2040. Cybersecurity, at its core, focuses on ensuring the security of cyberspace by eliminating all identified and potential threats. A proper approach to cybersecurity should ensure the stability and reliability of an environment in which production process control systems are a crucial element, being simultaneously key elements of critical infrastructure, in which energy systems are among the most important. The experience of recent years, related to cybersecurity incidents, including attacks on energy systems and the observed effects of these attacks, suggests that the monograph meets the needs of specialists who are, or will be in the future,

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responsible for the security of the energy sector, in which nuclear energy will play a key role. At the same time, historical evidence indicates that any failure at a nuclear power plant can have catastrophic and irreversible consequences. While the two significant nuclear power plant disasters (Chernobyl and Fukushima) had different causes, their impact on the environment remains devastating. Given these conditions, ensuring security, including cybersecurity, in nuclear energy is crucial for both the country's energy security and ecological and social security.

I believe that the monograph maintains a rational balance between the theoretical and pragmatic dimensions. It meets high criteria for substantive validity, and its content is current and credible. This is an undisputed scientific achievement for the author, who is an assistant professor at the Maritime Cybersecurity Center at the Faculty of Command and Maritime Operations at the Heroes of Westerplatte Naval Academy.

Analyzing the structure of the monograph, it should be noted that it is pragmatic and substantively coherent, and the individual chapters are a natural consequence of the adopted research assumptions and concepts. In the Introduction, the author introduces the reader to the monograph's subject matter, presenting the key determinants of the research conducted, the results of which formed the basis for this monograph.

In the first chapter, the author identified and systematized terms related to the perception of cyberspace and cybersecurity. She conducted a critical analysis of definitions in this area and addressed the place of cybersecurity in the national security system.

The second chapter focuses on nuclear energy. The author identifies the nuclear technologies used and addresses the importance of nuclear energy for human development. She identifies the opportunities and challenges associated with the operation of nuclear power plants and interprets the factors justifying investments in nuclear energy in Poland. She also presents the safety standards applicable to nuclear power plants.

The third chapter presents the results of research on the security of nuclear energy viewed through the lens of critical infrastructure, which determines the functioning of the state and its citizens. This crucial issue is directly related to the observed cyberattacks on critical infrastructure, in which energy systems play a crucial role. Chapter four is devoted to the legal framework for nuclear energy. The author examines international agreements and the resulting obligations regarding the peaceful use of nuclear energy. Analyses also focus on national legislation and the activities of international organizations in the field of nuclear energy.

In chapter five, the author presents the results of research on the level of nuclear security (regulatory models) in three selected countries: the United States, France, and Ukraine. As the author emphasized, this choice was dictated by their strategic importance. Issues related to nuclear regulatory governance, critical infrastructure protection, and regulations in the area of national cybersecurity systems are analyzed.

Chapter six presents the results of research on the regulatory model for nuclear energy cybersecurity in Poland. The content contained in this chapter constitutes a creative summary of the conducted research, is fully original, and is cognitively inspiring.

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Dr. Alicja Żukowska's monograph, "Cybersecurity in Nuclear Energy: Challenges, Regulations, and Management Models for Poland," is a work rarely found in the literature, one that meets the expectations of the specialist community, especially decision-makers and specialists responsible for the country's energy security. It should be emphasized that the reviewed monograph makes a significant contribution to the development of security, especially cybersecurity and energy security. Its publication seems justified, even essential. The knowledge contained within has a solid scientific foundation, a properly identified research area, insightful research questions, and a positively verified research hypothesis. At the same time, a pragmatic approach has been maintained, which is uncommon in scientific theses.

The final assessment of Dr. Alicja Żukowska's reviewed monograph is very high. I consider the publication of the monograph by a prestigious publishing house such as PWN Scientific Publishers to be highly justified and anticipated by the community.