XI CONFERENCE ON RADIATION PROTECTION AND RADIATION SAFETY IN NUCLEAR TECHNOLOGIES AND ANNIVERSARY OF THE MEPHI'S FIRST DEPARTMENT

Linge I. I.

Nuclear Safety Institute, Russian Academy of Sciences, Moscow

On October 26—29, Moscow hosted the XI Russian Scientific Conference on Radiation Protection and Radiation Safety in Nuclear Technologies. The conference was planned to be held in 2020 and, obviously, was timed to coincide with the 75th anniversary of nuclear industry. However, due to the pandemic it was impossible to held it on time. In October 2021, the situation in Moscow was still far from being perfect, nevertheless, it was decided to hold the conference. More than 300 specialists from organizations of the State Corporation Rosatom, the Ministry of Education and Science of Russia, the Ministry of Industry and Trade of Russia, Rostekhnadzor, Rospotrebnadzor, the Federal Medical and Biological Agency of Russia and the Russian Academy of Sciences, organizations of the EurAsEC countries, as well as private research and production companies took part in its sessions. Highly-qualified participants took part in the conference: among them were ten members and corresponding members of the Russian Academy of Sciences, over 50 PhD and doctors of sciences.

At the plenary session (Figure 1) and four sections of the conference (General issues, Computer Codes for the Demonstration of Radiation Protection and Radiation Safety, Safety at the Final Stages

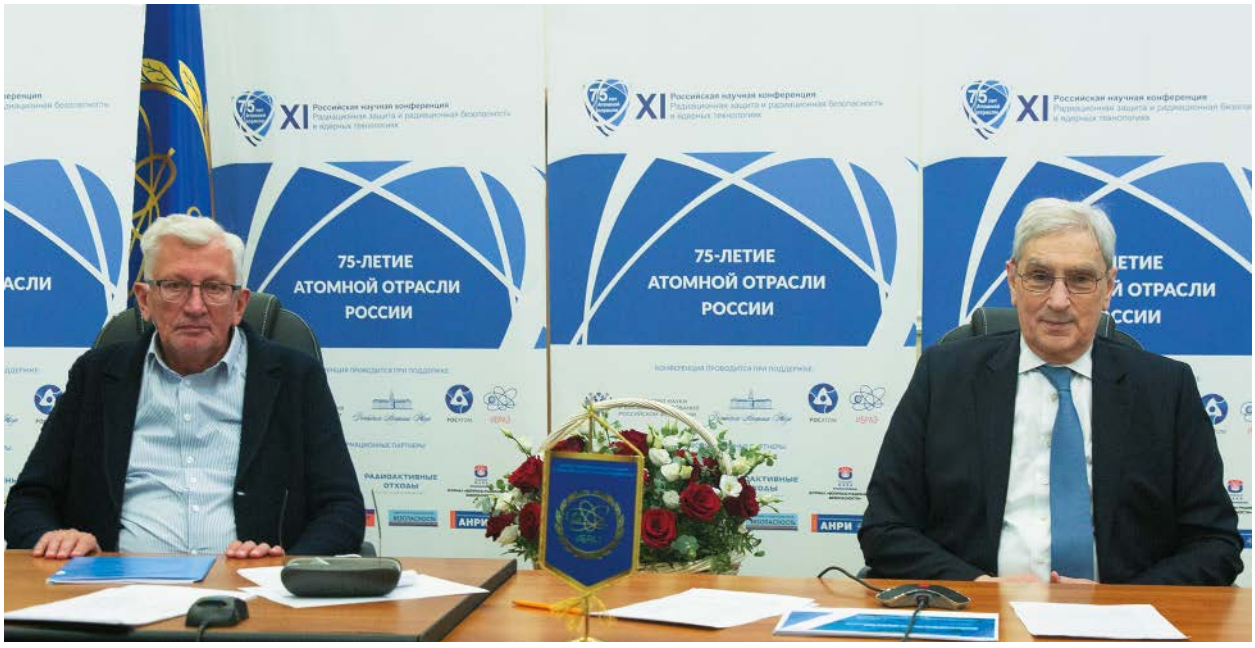

Figure 1. Opening of the XI conference on radiation protection and radiation safety of nuclear technologies via videoconferencing. Chairman of the Organizing Committee, Member of the Russian Academy of Sciences L. A. Bolshov, Deputy Chairman, Doctor of Technical Sciences I. I. Linge

of the Life Cycle, Radiation Safety in Nuclear Medicine), more than 100 reports were presented via videoconference.

It should be noted that for the second time radioactive waste management aspects have been considered in detail in the context of radiation safety assurance at a special section of the conference. For the first time, the topic of RW management was highlighted at the X Anniversary Conference held in 2015. Over the past period, RW management has suffered a big number of changes, in particular, our Radioactive Waste Journal has been published since 2017. Nevertheless, the enfoldment of Russian scientific forums remained at the same level: annual conferences on the accounting system for radioactive substances and radioactive waste in St. Petersburg and some events similar in the topics covered held on the Black Sea coast. A significant increase in the number of reports devoted to radioactive waste management is seen both as a direct reflection of the growing need for competent discussion and evidences that the strong relationship between RW management issues and the basic radiation protection principles for human and biota are well understood. It is important to note that this relationship is not linear (some set the standards, while others should comply with them). The basic principles of radiological protection, including the protection of future generations, were established under the direct influence of available radioactive waste inventories. Moreover, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management is the only international convention that explicitly states the requirement on the compliance with internationally recognized approaches in this area.

On the scope of the conference. The presented reports provided extensive evidence for the following conclusions:

- the challenges related to the radiation safety of the population and workers have been basically addressed for the vast majority of operating conditions considered common for the nuclear technology;
- there are many prerequisites for the establishment of even more effective safety systems in the field of atomic energy use.

The latter point is mainly associated with the enhancement of regulatory and legal framework in the field of radiation safety, the use of modern computing and digital technologies to address the radiation safety issues, tooling support to monitor the radiation situation and individual radiation doses.

In general, despite the shortened format provided for the exchange of opinions due to the pandemic

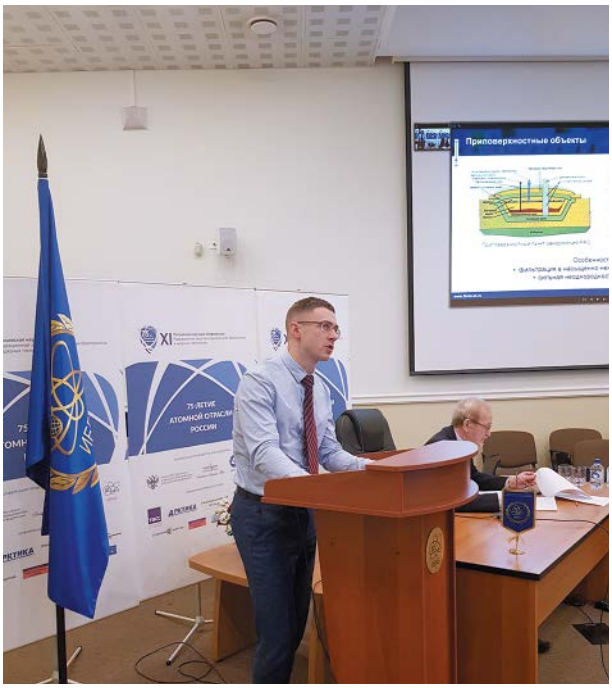

Figure 2. Photo from a conference section

restrictions, scientific aspects have been considered in a very constructive way with subsequent publication of the conference proceedings seen as its cut-off point.

The general progress basically achieved in the radiation safety and RW management in particular indicates one common and sad circumstance — stagnation in the development of regulatory support.

In terms of radiation safety, this stagnation was encoded in the provisions of the Federal Law On the Radiation Safety of Population adopted in 1995. In recent years, there have been no signs evidencing that the crisis situation has been resolved, and the draft amendment to this law proposed last year was more of a step to the side rather than a move forward. On the eve of the conference, thanks to the efforts of the General Inspectorate of the State Corporation Rosatom, proposals for a work plan in this area were set forth, and solidarity support for this plan was expressed at the conference itself. It is hoped that it will be implemented successfully.

In the field of radioactive waste management, the main needs for the regulatory framework development were summarized almost 5 years ago and mainly concerned the content of several criteria defined by the Decree of the Russian Government No. 1069 (Radioactive Waste Journal, No. 1, page 23). Yet, despite the simplicity of the underlying ideas, these have not been addressed as well. The reasons for these delays were common given the processes at hand: the desire to take into account various minor circumstances outweighed the understood incompleteness of the existing regulations. Until now,

it seems quite probable that necessary changes would be introduced to the criteria used to categorize RW as special (non-removable) RW and the classification criteria for RW disposal.

On the conference timing with anniversaries. The anniversary of the nuclear industry passed in a glorious, albeit poisoned by COVID-19, atmosphere, and it was followed by other, more local anniversaries, but nevertheless considered no less significant for those involved in RW management in general and for me in particular.

In October 2021, MEPhI's Department No. 1 turned 70 years old, celebrated was the 90th birth anniversary of Professor V. P. Mashkovich and 75th anniversary of Burnasyan SRC-FMBC (FMBA of Russia). I was equally lucky to graduate from MEPhI's Department No. 1 and from the postgraduate course of the department under the supervision of V. P. Mashkovich, to work for almost 10 years at the Institute of Biophysics (now FMBC FMBA) for some time being under the direct supervision of RAS member L. A. Ilyin and for more than three decades to work together with RAS member L. A. Bolshov, whose 75th birthday was also celebrated this year.

Establishment of a new department at the Moscow Mechanical Institute, as MEPhI was called at that time, was dictated by the time. Thanks to the successful testing of the first Soviet nuclear charges, receded was the threat of mass Soviet devastation and health protection of personnel working under high ionizing radiation exposure was included in the agenda of the new nuclear industry. Specialists in a new discipline Dosimetry and Protection started to graduate from the university, which had been training personnel for the Soviet nuclear program since 1946. My first acquaintance with the department was in the mid-1970s. It can be argued that this was the golden age of the department. The scientists who were at the forefront of radiation safety, radiation protection and dosimetry were still alive and actively engaged in the work, including professors O. I. Leipunsky and N. G. Gusev. The first graduates of the department became major specialists. Among them, first of all, professors V. P. Mashkovich, V. I. Ivanov and V. M. Kolobashkin. Strong teams of young specialists of a wide range of ages and positions have formed around them. Mashkovich's group included, for example, more than twenty specialists: associate professors V. A. Klimanov and V. K. Sakharov, senior and junior researchers, graduate students and trainee researchers. The scientific specialties of the department were no longer restricted to completely classified areas typical for the radiation safety issues in the 1950s—1960s. This paved the way for communication and cooperation with specialists from design and engineering institutes and organizations providing support for NPP operation.

Due to significant resources available, scientific leaders could set ambitious tasks, the solution of which positioned the department as a scientific leader in the field of dosimetry and radiation protection, which has now been converted into a more capacious concept — radiation safety.

V. P. Mashkovich initiatives involved two, which could be considered as most important for the future. Firstly, it was the arrangement of All-Union Scientific Conferences on the Protection Against Ionizing Radiation from Nuclear Installations. The first of them was held at MEPhI in 1974, the second took place four years later (Figure 3). The steering committee of the second conference was also headed by V. P. Mashkovich (Figure 4). Conferences were subsequently held in Tbilisi, Tomsk, Protvino and Obninsk.

The second initiative was the coordination of research by leading scientific organizations (MEPhI, Keldysh Institute of Applied Mechanics RAS, Central Research Institute of the Ministry of Defense of the Russian Federation, OKB Gidropress, VNIIAES, IPPE, etc.) to improve computational and experimental methods used to solve problems in radiation protection providing for the identification of most urgent tasks and the development of cooperation measures on a regular basis.

These initiatives were implemented with the engagement of not only V. P. Mashkovich and his faithful associates V. A. Klimanov, V. K. Sakharov and V. V. Bolyatko, but also his colleagues, in particular, A. A. Abagyan, T. A. Germogenova, E. E. Petrov, V. A. Lebedev and many others.

In addition to the above initiatives, some other commitments being similar in their aspiration should be noted: these were also consistently followed by V. P. Mashkovich. These involved the requirements for the availability of workshop plans and their compulsoriness, including weekly workshops held in his office and the departmental ones launched by O. I. Leipunsky, which played a much more significant role. It can be argued that V. P. Mashkovich made a great contribution to MEPhI that can be evaluated in several dimensions: the achievements of his own scientific school, development of an adequate communication environment for other scientific leaders who turned the department into a human resource for all scientific centers of atomic science, and, finally, thousands of those graduated from other MEPhI departments and faculties, who had a chance to get acquainted with his lecturing skills.

Figure 3. Presidium of the 2nd All-Union Scientific Conference on the Protection from Ionizing Radiation of Nuclear Facilities

Figure 4. Chairman of the Steering Committee, Professor V. P. Mashkovich

Department No. 1 has come a long way in these seven decades. Following the requests of developing scientific centers and enterprises of the industry, the profile of training specialists at the department was improved and its name changed accordingly. In the 1990s, it became known as the Department of Radiation Physics, Biophysics and Ecology, today it is the Department of Radiation Physics and Safety in Nuclear Technology. Those who work and study at Department No. 1 today, as well as hundreds of industry specialists who have graduated from the Department, can be rightfully proud of the bright pages of its history and the names of those who took hand in the development of its best traditions.

Personally, I did recognize the role of the department a few months after graduating from the graduate school, when I started working at the Order of Lenin Biophysics Institute of the USSR Health Ministry. My immediate supervisor Dr. of Technical Sciences V. F. Khokhlov was a MEPhI graduate who was always taking part in the radiation protection conferences. Those graduated from MEPhI and its Department No. 1 firmly occupied key scientific positions in all engineering and physics laboratories. The following names should be mentioned: R. M. Barkhudarov, O. A. Pavlovskiy, O. A. Kochetkov, M. N. Savkin, S. V. Panchenko. In those years, the Institute of Biophysics was the scientific center of the industry focused on the radiation safety and hygiene and RW management, in particular. Whereas, SPORO and other sanitary documents were the only regulatory documents available at that time.

In 1986, after the Chernobyl accident, all these issues could be grouped into a complex of challenges that were to be addressed by the Institute of Biophysics and the entire country for decades. By the end of 1986, I became the head of a laboratory dealing with the Chernobyl issues, which was followed

by years of hard work directly under the leadership of L. A. Ilyin, director of the Biophysics Institute run by the USSR Health Ministry, member of the Academy of Sciences. Two years later, the USSR Government made a decision on the establishment of the Nuclear Safety Institute (IBRAE) under the auspices of the USSR Academy of Sciences, and a year later I ended up at IBRAE. Over the past years, together with our colleagues from the Institute of Biophysics we have been engaged in many joint projects and events. It is clear that Chernobyl issues were considered as their main focus. In 2015, L. A. Ilyin was actively engaged in the Anniversary Conference on Radiation Protection (Figure 5).

The briefly overviewed background of the conferences and anniversaries emphasizes the fundamental relationship between radiation safety and radioactive waste management issues, the inevitability of holding the next XII conference at the turn of 2024—2025 and inspires hope that the pandemic restrictions end someday providing for its traditional offline format, like the Tenth Anniversary Conference (Figure 6).

Figure. 5. Member of the Academy of Sciences L. A. Ilyin and L. A. Bolshov

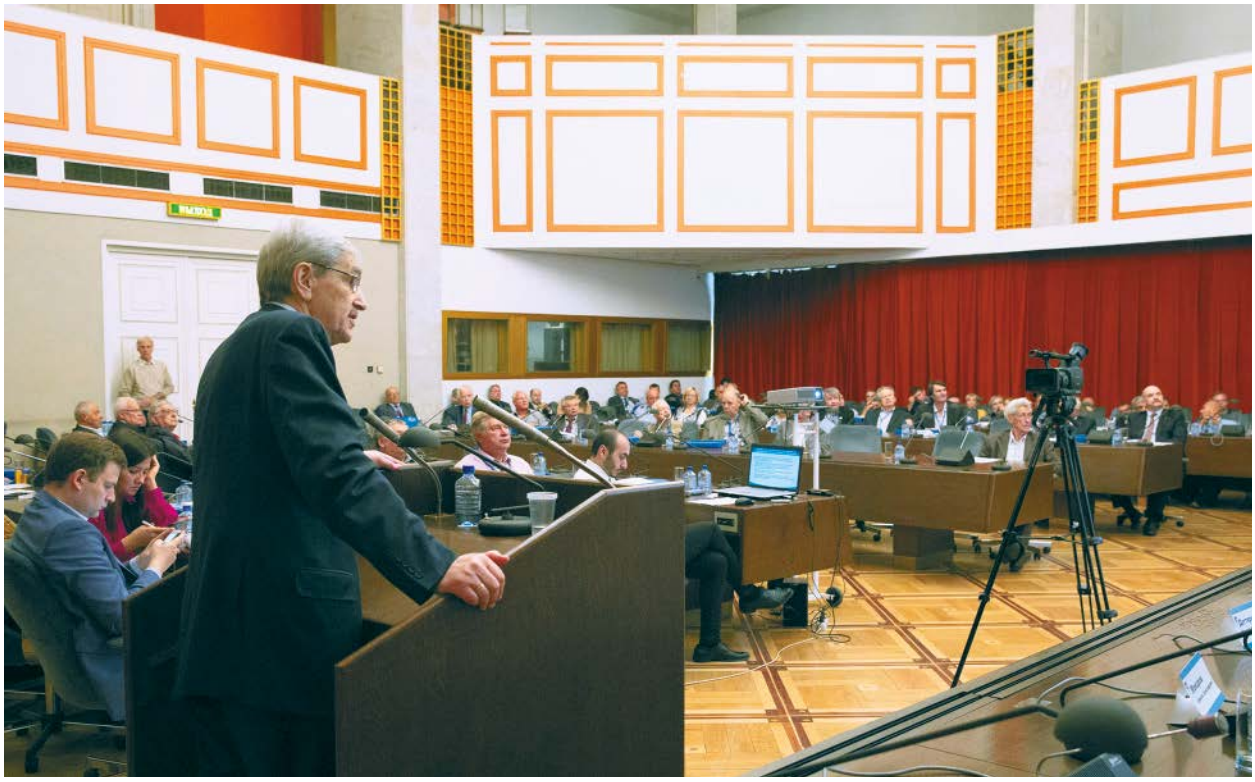

Figure 6. Report by the Chairman of the Steering Committee at the 10th Conference on Radiation Protection and Radiation Safety of Nuclear Technologies, Member of the Russian Academy of Sciences L. A. Bolshov (September 2015, Hall of the Presidium of the Russian Academy of Sciences)