

Technical Meeting on Nuclear Forensics: From National Foundations to Global Impact

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NUCLEAR FORENSICS IN THE REPUBLIC OF KAZAKHSTAN AND ROLE OF INTERNATIONAL COOPERATION IN ITS DEVELOPMENT

There are a large number of radiation-hazardous objects of different types located on the territory of the Republic of Kazakhstan: the sites of nuclear testing, research activities and nuclear power plants, the uranium- and oil- mining and processing plants. The large volumes involved with the shipments and transfer of nuclear and radioactive materials in Kazakhstan cause serious risks of illicit trafficking and nuclear smuggling. At the same time, it is necessary to take into account the geo-political position of Kazakhstan, the country which is located in the very center of Eurasia close to such countries as China, Russia, Kyrgyzstan, Uzbekistan, Iran, Afghanistan, etc. Kazakhstan considers the issues of combating illicit trafficking of nuclear and radioactive materials, including nuclear forensics, to be of great importance.

The activities of nuclear forensics are mainly performed in the Institute of Nuclear Physics.

One of the main activities of the Institute of Nuclear Physics is the development and application of nuclear-physical methods for the analysis of environmental materials including mineral raw materials. Currently, a range of nuclear-physical methods of analysis is available in the Institute of Nuclear Physics, established on the existing spectrometric and analytical equipment, including methods for elemental analysis such as neutron activation analysis, X-ray fluorescence analysis, inductively-coupled plasma mass spectrometric analysis and other instrumental and radiochemical methods of analysis for radionuclides and isotopic composition.

The Institute of Nuclear Physics has designed and developed a special hardware-and-methodological system for the forensics examination of various nuclear and radioactive materials and products. The wide range of available equipment and procedures is applied to the study of the materials/products received for examination.

The Institute is licensed for handling ionizing radiation sources, radioactive substances and waste, and for providing the services in nuclear energy application, including the determination of radionuclides in materials and in the environment; the Institute operates the necessary technical equipment for the wide range of analytical research activities in applied nuclear physics, including specialized laboratories and qualified staff of former "weapon" specialists with experience in similar work.

The quality of analyses is confirmed by successful participation in many international inter-laboratory comparisons and professional tests organized by the IAEA.

Lately, the international cooperation of INP is dynamically developing in nuclear forensics.

The representatives of our Institute have participated in several meetings of the International Technical Working Group (ITWG).

We have participated in various exercises "Csodaszarvas: Mystic Deer", "Galaxy Serpent", CMX-5, CMX-6 and planning to participate in CMX-7.

Many workshops, trainings and conferences have been held in Kazakhstan, which were supported by DOE with participation of specialists from several US National Laboratories.

The Inter-laboratory comparison study of nuclear materials from the Lawrence Livermore National Laboratory, US DOE has been completed. Now the partner project of the International Science and Technology Center "Advancement of material-technical and regulation-methodological framework for Nuclear and Radiologic Materials Forensics in the Republic of Kazakhstan" is being implemented jointly with LLNL.

And, of course, one cannot fail to mention the cooperation within the framework of the IAEA programs, in which events such as training at the Hammer training center (USA), training of two of our employees in the laboratory for the analysis of microparticles (Moscow, Russia), and a visit to the Hungarian laboratory nuclear forensics, were conducted. Of particular note is a series of IAEA regional seminars and exercises held at the Microparticle Analysis Laboratory (Moscow, Russia, 2017, 2019 and 2021) and the Institute of Nuclear Physics (Almaty, Kazakhstan, 2019)

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