

complex in radiotherapy compared with the radiation diagnosis is the radiation protection of personnel and patients. It is a system of protective measures that relate not only and not so much the measured doses received by personnel and patients, but also timely and correct regulatory sanitary and technical documents, guidelines for guaranteeing the quality of the entire technological process of radiotherapy, the timely creation of guidelines for quality control of the equipment used, which is rapidly improving. The training and subsequent professional development of personnel working in radiation therapy is also an important element of the radiation protection system for personnel and patients.

An important aspect of the functioning of this system is the prevention of radiation accidents in radiation therapy, the consequences of which can be very difficult. Complicating the design of new radiotherapy devices and methods of high-tech irradiation of patients led to the increase in the number of radiation accidents. In no small part, this factor has influenced the increased attention to the issues of radiation protection of patients. As a result, more attention was paid not only to the quality control of equipment, but also to the quality of the training material in the postgraduate improvement of physicians, physicists, technologists, engineers.

The basic principles and requirements for radiation protection in radiation therapy are an integral part and with their specificity in the requirements for radiation protection in medical radiation in general. In addition, it is necessary to distinguish between the radiation protection of personnel employed in radiation therapy and the protection of irradiated patients. If the same requirements can be applied to the protection of personnel as in other branches of human activity, then in respect of patients exposed to radiation treatment, radiation protection differs in principle from the protection of patients in diagnostic irradiation.

Radiation protection in radiation therapy is based on new International standards and recommendations, as well as national regulatory documents. Among them are the Recommendations of the International Commission on Radiological Protection ICRP No. 103, 2007; No. 105, 2011, which summarizes the latest scientific data on all aspects of radiation protection of personnel and the world population in all types of irradiation. The last recommendations are devoted to radiation protection of patients during medical exposure.

It includes:

1. Justification of medical procedures.
 - Justification of a specific radiological procedure (level 2).
 - Rationale for the specific patient (level 3).
2. Optimization of protection during medical exposure.
 - Diagnostic reference levels.
 - Radiotherapy.
3. Effective dose and medical exposure.
4. Irradiation of patients in a state of pregnancy.
5. Prevention of accidents with remote and contact radiotherapy.

In the implementation of radiation protection, the legal aspects of radiotherapy are also important. These aspects also concern the responsibility for the mistakes made by medical personnel, the relationship between the doctor and the patient, and the protection of medical and technical personnel from unreasonable charges.

EVALUATION OF MEASUREMENT UNCERTAINTY IN THE CONTROL OF MICROBIOLOGICAL PURITY OF PURIFIED WATER

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The subject of the study is the evaluation of measurement uncertainty in the control of microbiological purity of purified water.

The purpose of the course work is to study the sources of literature describing methods for estimating the uncertainty of measurements, to make an uncertainty assessment using the example of controlling the microbiological purity of purified water, to determine the range of values within which the true value of the microbiological purity of the water is purified within a certain range.

The paper gives the main terms and concepts related to measurement uncertainty, gives the results of tests to evaluate the repeatability and reproducibility of tests for the microbiological purity of purified water, and also calculations of the extended uncertainty that allowed determining the range of values within which the true value of the microbiological purity of water is purified in a certain range.

Keywords: uncertainty of measurements, entrance sizes, result of measurements, standard uncertainty, expanded un-certainty, analysis of correlations.

Nowadays the development of science and production, international cooperation is a prerequisite for further development, as well as the exchange of experience, methods and data. Before the international society arose the question about the need to compare, compare the methods of conducting tests and measurements. Moreover, today any testing area needs to evaluate the accuracy and accuracy of the measurements.

The concept of "uncertainty" in measurements, as quantified in terms of the measurement accuracy, is relatively new in the history of measurements, in contrast to the terms, error and error analysis, which have long been used in the practice of metrology.

With the adoption of the international standard ISO / IEC 17025: 1999, requiring the competence of testing and calibration laboratories, the requirements for uncertainty assessment in accredited laboratories have become international.

In order to facilitate cooperation between laboratories and agencies on accreditation, mutual recognition of measurement results and harmonization of national requirements and procedures with international ones in the Republic of Belarus, the national standard STB ISO / IEC 17025-2002 was introduced from 01.01.2002, which is an authentic text of the international standard mentioned above.

The purpose of this work is to study the sources of literature describing methods for estimating the uncertainty of measurements, calculating the uncertainty estimate for the example of monitoring the microbiological purity of purified water, determining the range of values within which the true value lies, i.e. the true value of the microbiological purity of the water purified in a certain range.

Next the procedure for estimating uncertainty by the example of the control of microbiological purity of purified water for the production of solid dosage forms No. 3 (production site No. 3) of JSC Borisov Medical Products Plant was performed.

The total standard uncertainty u_c was determined by the experimental standard deviation of the intra-laboratory reproducibility and the repeatability of the final test result. The extended uncertainty U is derived from the total standard uncertainty u_c with a coverage factor of k in the value of 2 to approximately correspond to a confidence level of 95 %. It was found that the expanded uncertainty U is equal 4.7.

GEOREACTOR AND ITS IMPACT ON THE ENVIRONMENT

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Considering the hypothesis of the existence of a nuclear reactor in the bowels of the Earth, the method of search of georeactor, as well as considering the effects of georeactor on the environment

Keyword: georeactor, inversion of the magnetic field, neutrino, geoneutrino, a radioactive element, a nuclear chain reaction, isotopic composition, neutrino detector, liquid and solid core nucleuses.

What prompted the person to think about the existence of a powerful energy source inside the Earth? One of the answers to this question can be associated with the inversion of Earth's magnetic field, with the occurrence of volcanic activity or with a gradual increase in temperature with depth observed at drilling ultradeep wells.

The geophysicist J. Marvin Herndon has hypothesized about the existence of georeactor in the bowels of the Earth, which proves that the accumulation of uranium and thorium, can occur a nuclear chain reaction .

One of the methods for finding a georeactor is the analysis of fission products migrating from the reaction zone and reaching the earth's surface. In particular, this is the isotopic composition of helium. In the air per million atoms of ^4He there is only one and a half atoms of ^3He . But in the basalts of the mid-ocean ridges, the isotope ^3He is more than 8 times larger. In ordinary radioactive decay only ^4He is produced. When the reactor is operating, heavy nuclei, absorbing the neutron, become unstable and can be divided into two large fragments with the emission of light charged particles and 2–3 neutrons. This reaction can be written as: $^{235}\text{U} + n \rightarrow ^{131}\text{Xe} + ^{99}\text{Tc} + ^4\text{He} + 2n$. In reactions of a somewhat different type, tritium is formed: $^{235}\text{U} + n \rightarrow ^{132}\text{Cs} + ^{99}\text{Tc} + ^3\text{H} + 2n$. Radioactive tritium, in turn, decays, emitting an electron (β decay) and antineutrinos, with the formation of ^3He :

