PECULIARITIES OF UKRRSS-97 AND THEIR APPLICATION AT NSC KIPT ACCELERATORS

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The main principles and peculiarities of the Ukraine's Radiation Safety Standards (UkrRSS-97) in comparison with RSS-76/87 and IRPC standards are considered and analyzed. The problems of NSC KIPT Acceleration Complex transition to UkrRSS-97 and the way of their settling are discussed.
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1 UkrRSS-97 MAIN PRINCIPLES

UkrRSS-97 order four groups of regularities which are adapted in conformity with conditions of human organism exposure to radiation [1] such as:

occupational activity;
medical treatment;
nuclear accident;
natural sources.

From the viewpoint of radiation protection the current and promising works at accelerators belong to the occupational activity. Actions on radiation safety in the occupational activity should be realized by the following principles [1]:

worth of activity;
optimization of radiation protection;
not exceeding the established dose limits.

Optimization of radiation protection is the most effective at the project stage. If therewith one selects, as an individual dose limit in the optimization range, the value being less than the main limit, then the fulfilment of the "not exceeding" principle is assured and comes to the formal testing and control [2]. For the personnel a criterion of fulfilment of the "not exceeding principle" is the well-known equality [1 - 3]:

$$E / LD + \sum_i I_i / ALI_i \le 1 ,$$

where LD - the annual dose limit;
ALI_i - the limit of inhalation **i-** nuclide entering;
E - real annual dose of external radiation;
I_i - real annual inhalation **i-**nuclide entering.

Taking into account that for NSC KIPT accelerators the inhalation radionuclide entering into the human organism (in the form of aerosols as well as gases) can be neglected, we obtain:

$$E/DL \le 1.$$

According to UkrRSS-97 by the value E as used herein it is intended *an effective dose*. The effective dose limit DL=20 mSv (2 ber) in the average for five consecutive years but no less than 50 mSv for each separate year. These limits coincide with corresponding recommendations and international standards [2, 4].

2 PECULIARITIES OF UkrRSS-97

Distinction between UkrRSS-97 and RSS-76/87 does not consist in the mechanical decrease of the dose limit. Firstly, the notion (physical sense) itself of a dose in comparison with its limit is changed. Secondly, the five-year period of averaging the annual dose is introduced. Thirdly, the sphere of radiation safety standards is modified and extended.

All this leads to the necessity of changing, in some details**,** the system of radiation dosimetric control, conducting measurements and interpretation of the results, taking administrative decisions etc.

According to the IRPC recommendation [2] the former notion "*equivalent dose*" is given practically to the new dose value (mean dose in the organ). Some key notions of new radiation safety standards (effective dose, occupational activity, optimization, hazard, damage etc.) were not included in the former normative documents. In turn, UkrRSS-97 does not contain some usual standards (permissible dose rate PDR, permissible flux density PFD for gamma- and neutron radiations, permissible content PC_A etc.).

Distinctions in theoretical and experimental fundamentals of UkrRSS-97 and RSS-76/87 are substantiated also by the results obtained for the last two decades in different fields of knowledge (radiobiology, medicine, dosimetry etc.) on which the radiation safety science is based.

3 PROBLEMS OF TRANSITION TO UkrRSS-97

From the above it follows that there are the objective reasons due to which UkrRSS-97 seems to be more difficult for understanding and practical application. Though, in fact, the conception of an effective dose and the use of an equivalent dose in combination with IRPC recommendations for the practical application of radiation monitoring make it possible to draw up more strictly a system of radiation safety in general, and at accelerators in part.

The primary difficulty of applying UkrRSS-97 at NSC KIPT accelerators consists in that the common measuring system of individual dosimetric control for external exposure (thermo-luminescent dosimeter with accumulators based on detectors from LiF: Mg, Ti in cassettes with the aluminum filter) does not satisfy the present-day requirements. According to IRPC recom-

mendation for evaluation of the effective dose from the external irradiation by the means of individual control one should measure the value of $H_p(10)$ i.e. the individual equivalent of a penetrating radiation dose [5]. To determine the conditions under which the existing system meets the necessary demands for measuring the external gamma-radiation it is necessary to perform proper calibrations and comparisons [6]. At the same time at NSC KIPT one has not difficulties of principle caused by putting a lower threshold dose: for the last ten years the maximum annual dose of personnel irradiation did not exceed 10 mSv.

So, the main real problems of transition to UkrRSS-97 can be settled.

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