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1. Introduction.

Linear Non-threshold Concept (LNC) of harmful stochastic radiation effects (carcinogenic and genetic) occurrence frequency as a function of dose being used unconditionally in radiological regulation resulted in unreasonable toughening of requirements and in creation of a complex multistage structure of radiation protection system. That made the society a hostage of single-sided theoretical constructions, which are far away from real practice of nuclear energy use. At the same time recently numerous data based on extensive radio-biological, epidemiological and statistic research have been accumulated, and these data challenge the validity of the non-threshold concept. Further confusion was introduced by the concept of dose constraints suggested by ICRP for the situations of planned radiation exposure, according to which the dose constraints should be less than the dose limit, however practically everybody perceives those constraints as strict dose limits with values below 1 mSv per year (0.3, 0.1 or even 0.01 mSv/a). Unfortunately these values of annual doses are rashly suggested to be included into regulatory documents though these doses are substantially lower than even fluctuations of natural radiation background.

2. Objectives.

At the initial stage of the use of atomic energy, up to the 1960s, the community of scientists and specialists on radiation protection performed enormous work on validating and ensuring the highest standards for radiation safety for the general public and for workers. The work of ICRP, UNSCEAR, IAIA and other international and national organizations played a large role in this work. However, in the last few decades the normalized quantities have shifted into a range of irradiation doses which are many orders of magnitude smaller than the values at which real effects of harmful exposure to radiation on the human organism have been observed. At the present time, the system of regulations of radiation safety is based on the following postulates which have been adopted without proof:

- validity of the linear, zero-threshold concept;
- inclusion in the range of practical regulation irradiation doses to people down to 10mkSv/a (i.e., less than one two-hundredth of the average yearly individual irradiation dose to the population on Earth);
- independent regulation of the irradiation from technogenic radionuclides and the natural background, including the regulated component of the irradiation from radioactive radon, whose contribution for tens of millions of people is several-fold and sometimes an order of magnitude greater than the irradiation from other components of the natural background;
- rejection, essentially, of optimization measures for regulating radiation risk taking account of other unfavorable factors affection people's health - i.e., deliberately placing radiation risk into a special, most dangerous category.

The evolution of radiation safety norms, first and foremost, in respect to the transition to regulation of radiation risk in the range from 1 to 0.01 mSv/a, has resulted in the detachment of the system of normalization from the real safety indicators for atomic technologies. The assessment of the negative effect of nuclear power over its entire cycle on mankind and the environment has long been of a purely theoretical nature and cannot be definitively settled. Nonetheless, radiation safety is a special subject of numerous ecological analyses by experts and attracts unusually keen attention from oversight agencies and the general public. It is obvious that the criteria presented above are in striking contradiction not only to scientific data but also to common sense, considering the data on the actual irradiation of the population from the natural background.

The actual situation in the world demonstrates that at present the radiation exposure of population living in the areas of radiation-hazardous plants are very low and do not endanger the health of people. That is why *there is no need in toughening the RP regulations*, moreover, in order to create conditions for advanced development of civil use of atomic energy *it is reasonable to correct these regulations towards their mitigation*.

3. Discussion.

ICRP Publication 103 consist the following provisions of the new RP system: - abandonment of the "practice and interference" concept and replacing it with the concept of three types of exposure situations – *planned, emergency and existing exposure situations*.

Based on the analysis of basic statements of ICRP Publications, UNSCEAR reports and RP norms in Russia, as well as on the knowledge of necessity of correcting national regulatory documents, the following concept of evaluation of radiation protection standards for population can be proposed:

Planned exposure situation	
annual dose, mSv	Commentary
5	In our opinion in the new regulatory documents should revert to a dose limit for population of 5 mSv/a in this exposure situation. It should be emphasized that <i>dose limit</i> for population of 1 mSv per year stated in Publication 103 is not the actual annual dose limit and in some cases this value may exceed 1 mSv per year. But we proposed annual dose limit should be <i>very rigid</i> and its any excess in planned exposure situations is inadmissible
1-5	This area of annual doses can enter the scope of <i>dose constraint</i> concept, on the basis of optimization process, which relies on comparison of costs of planning activities aimed at decreasing population exposure doses with benefit for those people resulting from decrease of their lifetime risk factor
<1	Must be declared that population exposure doses <i>below 1 mSv per year</i> are absolutely safe for health of public
<0.1	The exposure doses <i>equal or below 0.1 mSv/a</i> must be approve as an <i>exemption</i> level from some or all radiological protection regulatory requirements and need not be regulated

Emergency exposure situation	
Reference level, mSv	Commentary
1000	It's seems to us that the value 1000 mSv for the reference level as the upper bound in the emergency exposure situations is too high and it is necessary to lower to 500 mSv
>500	In the case if the <i>highest planned residual doses for population</i> (HPRDP) can exceed the upper bound of reference levels (500 mSv) - all possible measures (including immediate evacuation of people) on decrease of these doses to the level 500 mSv and less should be carried out. Realization of such measures should be carried out without dependence from their real cost and expected efficiency on protection of people
100-500	If the HPRDP can be in the range 100 - 500 mSv - some possible measures on decrease of these doses to the level 100 mSv and less can be used. Application of these measures for protection of people is desirable even in the case when their expedience will not be proved by the principles of optimization
20-100	If the HPRDP can be in the range 20 - 100 mSv - some possible measures on decrease of these doses to the level 20 mSv and less can be used. Realization of these actions should be spent only in the case when their expedience will be proved by the principles of optimization
10-20	If the HPRDP can be in the range 10 - 20 mSv - only most elementary, but significant from the social point of view, actions can be carried out and that only in the case when their expedience will be convincingly proved by the principles of optimization
<10	If the planned residual doses in emergency situations for population can be below 10 mSv - any measures on protection of people it is not necessary to carry out. According to ICRP recommendations the "annual dose below about 10 mSv may be used as a generic reference level below which intervention is not likely to be justifiable" (see para 147, Publication 96)

Existing exposure situation		
ICRP recommended that the "Reference levels for existing exposure situations should be set typically in the 1 mSv to 20 mSv band of projected dose". (see para 287, Publication 103)		
On our opinion for the upper bound of the reference level in this situation must be used the annual projected dose of 100 mSv.		
Reference level, mSv	Name of Zone	Commentary
>100	Exclusion zone	In this zone permanent residence is forbidden; economical activities and nature management are controlled by specific acts. Monitoring and protection activities including obligatory and individual radiation control are performed for workers. People who have been living in this zone during the period of radioactive contamination are empowered to leave this zone receiving a full compensation for material loss, costs of removal and building new domicile
50-100	Resettlement zone	Entrance for permanent residence to such territories is forbidden. Permanent residence in these territories is forbidden for people of childbearing age and children. Radiation monitoring of people and environmental objects and necessary radiation and medical protection activities are performed here. People who have been living in this zone during the period of radioactive contamination and who are willing to leave this zone are empowered to do so receiving a partial compensation for material loss, costs of removal and building new domicile. Some most effective measures on decrease of projected doses can be used. Realization of these actions should be spent only in the case when their expedience will be proved by the principles of optimization
20-50	Zone of restricted inhabitancy	This zone requires radioactivity monitoring of environmental objects, agricultural products and monitoring of internal and external exposure of population and critical groups. Partial substitution of pure imported foodstuffs for local radioactive-contaminated ones is possible. Restrictions are introduced for voluntary entrance for permanent residence to such territories. People moving to those territories for permanent residence should be notified about possible risk of health damage due to radiation impact. Some measures on decrease of projected doses can be used. Realization of these actions should be spent only in the case when their expedience will be proved by the principles of optimization
5-20	Radiation control zone	This zone requires radioactivity monitoring of environmental objects, agricultural products and monitoring of internal and external exposure of population and critical groups. Voluntary entrance for permanent residence to such territories is unrestricted. People moving to those territories for permanent residence should be notified about possible risk of health damage due to radiation impact. Only most elementary, but significant from the social point of view, actions can be carried out and that only in the case when their expedience will be convincingly proved by the principles of optimization
<5	Normal vital activity zone	This zone refers to population exposure conditions, which are typical for normal situation in the areas with a bit raised natural radiation background, and neither radiation control activities, nor human protection in this zone are required

4. Conclusions

It is generally recognized that existing International and National regulations and legislative acts are intended not only to assure nuclear, radiation and ecological safety of Nuclear and Radiation Hazardous Facilities, but they also should not unreasonably preclude from development of ecologically effective atomic energy and from extensive implementation of nuclear technologies into national economics, healthcare and science.

Currently existing complex multistage structure of radiation safety system is to a great extent based on LNT model, the use of which resulted in unreasonable toughening of radiation safety requirements, in considerable economic, social and psychological expenses. The proposed regulations, based on implied reasoning, totally exclude both deterministic and stochastic effects. This will give possibility to reduce the number of restrictions and to make them more appropriate and logical; this will also liberalize requirements for evaluating and measuring annual exposure doses. However, compliance of the proposed human protection standards in most cases does not introduce the severe limitations into people's activity and style of living.