Survey on the implementation of the "justification", "optimisation" and "limitation of doses" radiological principles in national regulations in Europe

LITHUANIA

1 The implementation of European Directives

1. *Since when have the European Directives 96/29 and 97/43 been implemented in your country?*

European Directive 96/29 in the national legislation has been implemented in 1997 and 97/43 in 2001.

Lithuanian Hygiene Standard HN 73:2001 "Basic Standards of Radiation Protection", adopted by the Order of Minister of Health No. 663 on 21 December 2001 (the first version was adopted by the Order of Minister of Health No. 708 on 24 December 1997)

2. *If they are not implemented, is it expected and when?*

2 Justification principle

1. *What is the exact wording of the justification principle in the Law?*

The principle of justification of the operation of sources of ionising radiation - the economic, social and other benefits yielded by all types of practices involving operation of sources of ionising radiation to individuals or society must outweigh the detriment radiation causes to human health and the environment (Law on Radiation Protection, on 12 January 1999 No. VIII-1019)

2. *Which practices are explicitly named as unjustified or forbidden?*

According the Law on Radiation Protection:

1. It shall be prohibited to produce, operate, market, store, assemble, maintain, repair, recycle, and transport sources of ionising radiation and handle (collect, sort, treat, keep, recycle, transport, store and decontaminate) radioactive waste without a licence issued by the Radiation Protection Centre.

2. It shall be prohibited to import, export, carry in transit or transport radioactive substances in the Republic of Lithuania without an authorisation granted in the manner prescribed by the Government or a body designated by it.

3. The procedure for the import, transit and export of radioactive substances in the category of controlled commodities shall be regulated by the Law on the Import, Transit and Export of Strategic Commodities and Technologies.
4. It shall be prohibited to add intentionally radioactive substances to foodstuffs, toys, jewellery, cosmetics and to market, import and export such products.

3. *Which regulatory body(ies) is (are) responsible to determine if a practice is justified or not?*

Radiation Protection Centre – regulatory body in radiation protection field.

3 Optimisation principle

1. *Could you give is the exact wording (citation) of the optimisation principle (ALARA) as defined in the Law or national regulation?*

The principle of optimisation - any kind of exposure of individuals and society must be as low as reasonably achievable, economic and social factors being taken into account.

2. *Does the national regulation give a description on the practical way to implement the optimisation principle (e.g. need to perform dose prediction and to establish dose objectives, need to perform real-time dose follow-up, need to write feedback experience report, etc)?*

Yes.

3. *Does it exist a specific guidance to help operators / end-users in implementing the optimisation principle?*

1. Hygiene Standard HN 31:2002 "Radiation Protection and Safety in Medicine X-rays Diagnostic Practice"
2. Hygiene Standard HN 77:2002 "Radiation Protection and Safety in Nuclear Medicine Practice"
3. Hygiene Standard HN 95:2005 "Radiation Protection and Quality Control in Radiotherapy"
4. Hygiene Standard HN 52:2005 "Radiation Protection and Safety in Industrial Radiography"
5. Hygiene Standard HN 83:2004 "Radiation Protection and Safety of Outside Workers"
6. Hygiene Standard HN 86:2005 "Non Medical Nuclear and X-rays Equipment"
7. Hygiene Standard HN 87:2002 “Radiation Protection in Nuclear Facilities”
8. Hygiene Standard HN 88:2000 “Radiation Protection and Safety Non Medical Unsealed Sources"

4 Dose limits

1. *Can you provide us with present regulatory dose limits established to reduce the probability of occurrence of stochastic effects?*

1. Dose limits for workers shall be:

1.2. effective dose - 100 mSv in a consecutive 5 year period;

1.3. maximum annual effective dose - 50 mSv;

1.4. equivalent dose for the lens of eye – 150 mSv;

1.5. equivalent dose for the skin, hands, forearms, feet and ankles - 500 mSv.

This limit applies to the average dose over 1 cm^2 of the most highly irradiated area of the skin.

2. Dose limits for apprentices (students):

2.1. for apprentices (students) aged 18 years and over who, in the course of their studies, are obliged to use sources shall be the same as referred in point 1.;

2.2. between 16 to 18 years who, in the course of their studies, are obliged to use sources, shall be:

2.2.1. annual effective dose - 6 mSv,

2.2.2. annual equivalent dose for the lens of eye – 50 mSv,

2.2.3. annual equivalent dose for the skin, hands, forearms, feet and ankles – 150 mSv.

This limit applies to the average dose over 1 cm^2 of the most highly irradiated area of the skin.

3. Dose limits for members of the public shall be:

3.1. annual effective dose – 1 mSv;

3.2. in special circumstances, annual effective dose - 5 mSv, provided that the average dose over five consecutive years does not exceed 1mSv per year;

3.3. annual equivalent dose for the lens of the eye – 15 mSv;

3.4. annual equivalent dose for the skin- 50 mSv.

This limit applies to the average dose over 1 cm^2 of the most highly irradiated area of the skin.

The condition for the pregnant female worker and apprentice (student) in the context of her employment shall therefore be such that the foetus is protected according to the para 3 and the equivalent dose to the foetus will be as low as reasonably achievable and this dose will not exceed 1 mSv during at least the remainder of the pregnancy.

Emergency exposure of workers:

1. Licensees or intervening organization are responsible for limitation of exposure of workers or intervening personnel;
2. No worker undertaking intervention shall be exposed in excess to the dose specified in para. 1, except for cases when it is necessary:
2.1. to save life or prevent serious injuries,
2.2. to avert large collective dose,
2.3. to prevent development of catastrophic conditions;
3. In special cases of intervention, referred to in para. 2 it is necessary to undertake reasonable actions that the dose incurred by workers involved in intervention does not exceed 100 mSv;
4. If intervention is undertaken for life saving, every effort shall be made to keep the doses incurred by workers involved in intervention below 500 mSv;
5. Workers when their exposure doses may exceed maximum permissible annual limits shall be volunteers and shall be clearly and comprehensively informed in advance about health risk and shall, to the extent feasible, be trained in actions that may be required.

No specific dose limits for permanent and interim workers, males and females;
Life dose no.

2. *What are the legal dose limits to prevent public and workers from deterministic health effects?*

No

5. Dose constraint

1. *Here again, could you give is the exact wording (citation) of the Law or regulations where the concept of dose constraint is mentioned.*

The definition of the dose constraint is given in the Lithuanian Hygiene Standard HN 73 :2001 ,"Basic Standards of Radiation Protection" *paragraph 7.11.1.*
dose constraint - restriction of the individual doses from the concrete source, which used in optimization of radiation protection. Dose constraint is applied in such a way, that even if a few sources are irradiating members of critical group, their doses do not exceed the defined dose constraint. The unit is Sv/year.
General requirements of the Hygiene Standard state that: p. 10 states that, For optimization of protection, where appropriate, dose constraints shall be applied [7.11.1]. Dose constraint can be applied also to individuals (other than a part of their occupation) voluntarily helping patients, participating in medical and biomedical research programs.

2. *In which domain (e.g. public dose, occupational dose, patient dose, etc) and by whom (regulatory body, operators, etc) are dose constraints implemented in your country?*

In Lithuania, the demand for setting out the dose constraint is given in legislation. However, the dose constraints for particular domain are different

For medical exposure: *paragraph 64.9.3.* of the HN 73:2001 states that the licensee shall establish dose constraints for individuals, for whom no direct health benefit is expected. These constraints shall be approved by the Radiation Protection Centre. Currently the dose constraint for such type of practice is 0.3 mSv/year.

For consumer products: *paragraph 80.2.1.* states that products comply with requirements set by this Hygiene Norm, and doses due to manufacturing, use, misuse and disposal do not exceed the dose constraints approved by the Radiation Protection Centre.

For nuclear facilities, *Lithuanian Hygiene Standard HN 87:2002 ,,Radiation Protection in* Nuclear Facilities: *paragraph 87*: Due to operation and decommissioning of nuclear facilities, the dose constraint for the members of general public is 0.2 mSv/year.

The dose constraints for the occupational exposure are set by the operators.

The dose constraint is not applicable to patients exposure. In this case the recommended exposure guidance levels shall be followed.

3. *What are the corresponding values and rationales behind these values?*

The constraints are source-related. However, it is not considered as a level below which the optimization principle has not to be applied, rather the upper values which shall not be exceeded. Even if it is not exceeded, the operator has to show the necessity of application of optimization principle.

4. *What is(are) the status(es) of dose constraint(s)?*

Yes, it is mandatory to use the dose constraints.

5. *What is effectively done if a constraint is exceeded?*

In principle, not exceeding the dose constraint value shall be already verified during the design phase of facilities, in which the practices are planned. In case if the dose constraint is exceeded, measures shall be taken to investigate the reasons and to reduce the levels below the dose constraint.