IMPLEMENTATION OF THE BASIC SAFETY STANDARDS IN THE REGULATIONS OF EUROPEAN COUNTRIES

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Introduction

The Euratom Basic Safety Standards for the radiological protection of workers and the general public against the dangers arising from exposure to ionizing radiation were laid down in Directive 96/29/Euratom adopted by the Council in May 1996. It should have been implemented in Members States before 13 May 2000. Other European countries should refer to the "International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources" issued in 1994 and jointly sponsored by FAO, IAEA, ILO, OECD/NEA, PAHO and WHO.

The objective of this information sheet, is to review the progress in implementing these Basic Safety Standards in the national regulations of European countries. This paper will describe specifically how the three fundamental principles of radiological protection have evolved (justification, optimisation and limitation).

The implementation of the European Directive was expected before mid-May 2000, most of the different Member States have today integrated it into their national laws. However, in those countries where it is not yet totally integrated, the projects are quite close to the final draft and will be therefore referred to in that presentation.

Table 1. Status of the Implementation of the Basic Safety Standards in the Regulations of European Countries (April 2002)

EC COUNTRIES	Progress in the implementation of the BSS	Date of implementation of the BSS
Austria	*Draft*	*Expected 2002*
Belgium	**Implemented**	20 July 2001
Denmark	**Implemented**	1 January 1998
Finland	**Implemented**	Before 13 May 2000
France	Partially Implemented	March 2001/April 2002
Germany	**Implemented**	1 August 2001
Italy	*Ready*	*1 January 2001*
Spain	**Implemented**	6 July 2001
Sweden	**Implemented**	1 December 2000
The Netherlands	**Implemented**	September 2001/ 19 February 2002
UK	**Implemented**	1 January 2000
NON EC COUNTRIES		
Czech Republic	*Ready*	*1 July 2002*
Hungary	**Implemented**	2000
Lithuania	**Implemented**	12 January 1999
Norway	**Implemented**	2000
Slovak republic	Partially Implemented	2001
Slovenia	*Ready*	*Expected 2002*
Switzerland	**Implemented**	1994
Ukraine	**Implemented**	1998

Justification Principle

The justification principle is the first fundamental principle of the system of radiological protection recommended by the International Commission on Radiological Protection (ICRP). In the EURATOM Directive justification is not mentioned as a radiation protection principle, but as a "general principle". It is the first "radiation protection requirement" in the International BSS.

Previous situation

In most regulations, this principle was not specifically addressed before the implementation of the new BSS. Instead, all practices actually implemented were implicitly considered as justified. However, some practices or trades were explicitly named as unjustified and consequently forbidden in the national regulatory texts. These included, for example, fluoroscopy for shoe-fitting, fishing floats, trade in beta lights (e.g. in the Netherlands), radioactive substances added in the production of foodstuffs, toys, personal ornaments and cosmetics (e.g. in Italy, Sweden, France) and lightning conductors (Italy, France). In Germany, there were no practices directly forbidden, however, there was always agreement between the Federal Ministry and all the Länder Authorities on practices they would or would not authorize.

Implementation of the new BSS

Once the new BSS will be implemented, the justification principle will be explicitly stated in almost all-national regulations.

Wording

"Member States shall ensure that all new classes or types of practice resulting in exposure to ionising radiation are justified in advance of being first adopted or first approved by their economic, social or other benefits in relation to the health detriment they may cause. Existing classes or types of practice may be reviewed as to justification whenever new and important evidence about their efficacy or consequences is acquired". (Council Directive 96/29/EURATOM, General Principles, Article 6.1 and 6.2)

"No practice or source within a practice should be authorised unless the practice produce sufficient benefit to the exposed individuals or to society to offset the radiation harm that it might cause; that is: unless the practice is justified, taking into account social, economic and other relevant factors"
(IAEA Safety series 115, International Basic Safety Standards, Principal Requirements § 2.20-§ 2.22)

A quick reading of the wording associated with the justification principle subsequently adopted in the European national regulations gives the impression that they are very close to the above. In fact, the wording used mostly reflects "cultural" differences.

In **Germany**, the justification principle was already stated in the former Radiation Protection Ordinance. However, it is now stated even more explicitly, closely following the wording in the European Directive.

In **Switzerland** (which does not belong to the EC), the justification principle is explicitly noted in the Federal Act on radiological protection (art. 8) and in the corresponding ordinance (art. 5).

In France, Denmark, the Netherlands and Norway (which does not belong to the EC), the justification principle is applied to a very large set of human activities (and goes beyond articles 6.1 and 6.2 of the European Directive):
"The economic, health or other benefits that arise from an activity or an intervention shall be greater than their inherent inconveniences"(**France**, **Sweden**).
"The benefit should outweigh the health damage. If not justified, a practice is not allowed."(**The Netherlands**).
"At every use of radiation the advantages shall go beyond the risks"(**Denmark**).
"Any human activity involving radiation sources has to be defendable: the benefits of the activity shall exceed the risks associated with the radiation"(**Norway**).

In Finland and Sweden, the justification principle applies mainly to practices (a practice is a human activity that can increase the exposure of individuals to radiation):
"The benefits accruing from the practice shall exceed the detriment it causes"(**Finland**).
"Anyone who conducts a practice with ionising radiation shall ensure that the practice is justified by which is meant that the use of radiation gives a benefit that exceeds the estimated health detriment caused by the radiation"(**Sweden**).

In **Spain**, **Belgium and Slovenia** the justification principle is mentioned for new practices:
"All new classes or types of practice involving exposure shall be justified by the promoter to the competent Authority, which will then decide on […] its adoption considering the benefits in relation to the health detriment they may cause"(**Spain**).
"The different types of practices leading to ionising radiation exposures shall be justified before the first adoption or the first authorisation, taking into account and balancing the corresponding advantages and drawbacks, including the health aspects"(**Belgium**).

In **Ukraine**, the wording concerning justification includes within the evaluation of the harm the occurrence of a critical event (accident) and the willingness to take care of the future:
"a practice which can lead to exposure to ionising radiation shall not be implemented if the benefit for the people exposed and society in general dose not exceed the harm from this activity now and in the future in connection with the potential occurrence of critical event"

Austria is the only country where it is stated that established practices are considered justified as long as no important new insights prompt reconsideration. Application of new practices has to be justified.

In the **United Kingdom**, the justification principle has not previously been explicitly addressed in occupational exposure legislation. It is recognised that an appropriate legal instrument will have to address this. However giving the justification principle legal force within the UK legislative system has posed a number of regulatory enforcement issues. A proposed way forward is currently being considered by Ministers.

Legal Requirements

Some national Authorities have specified regulatory requirements for enforcing the justification principle: these include lists of justified and unjustified practices, evaluation procedures of practices, etc.

In **Germany**, some practices (for example, the irradiation of filters from water supply stations with Co-60 sources which was a common practice in East Germany before the reunification) or particular uses of radiation (consumer products such as ordinary watches containing radioactive material) will be explicitly forbidden in the "administrative provisions" which accompany the implementation of the rules laid down in the Ordinance. The decision whether a practice is justified or not is taken by the Federal Ministry of Environment, Nature Conservation and Nuclear Safety on the basis of a common understanding with the Länder Authorities.

In **Belgium**, before the acceptance of a new activity or practice, it is now mandatory to undertake a justification study that can be reviewed by the competent authority.

In **France**, it is now clearly stated that the competent authority in pursuance of the justification principle could forbid a nuclear activity.

In **Spain and Slovenia**, the authority may propose to review the justification of existing practices whenever new and important evidence about their efficiency or consequences is revealed. In Spain the justification of a new practice has to be approved by the competent Authority, e.g. the Government Departments and by the CSN. The CSN is the only competent Authority for the justification revision of existing practices.

In the **Netherlands**, there will be a ministerial Ordinance with a list of justified and a list of non-justified

practices and work activities. If the activity is not on the list as a ”justified practice”, it will be forbidden, unless a request for justification, with good supporting arguments, is approved.

In **Switzerland**, activities involving ionising radiation leading to an effective dose less than 10 µSv/year shall always be regarded as justified.

The justification principle is now re-emphasised in nearly all countries regulations. This is accompanied by a stronger control by Authorities of activities involving radioactive substances.

Optimization Principle (ALARA)

The optimization principle has been reemphasized as the core of the system of radiological protection in the ICRP Publication 60 and in the European Basic Safety Standards.

Previous Situation

The optimization principle was already stated in most national laws, albeit in general terms, often without any practical guidance (but in countries like the UK through an approved code of practices). Consequently, the application of optimization for practices was often quite limited.

Implementation

The implementation of the new BSS appears to provide both the Authorities and users of ionizing radiation sources with more precise guidance on how to apply the optimization principle.

Wording

“In the context of optimization [Member States shall ensure that] all exposures shall be kept as low as reasonably achievable, economic and social factors being taken into account”. (Council Directive 96/29/EURATOM, General Principles, Article 6.3)

“In relation to exposures from any particular source within a practice, except for therapeutic medical exposures, protection and safety shall be optimised in order that the magnitude of individual doses, the number of people exposed and the likelihood of incurring exposures all be kept as low as reasonably achievable [ALARA], economic and social factors being taken into account, within the restriction that the doses to individuals delivered by the source be subject to dose constraints”. (IAEA Safety Series 115, International Basic Safety Standards, Principal requirements § 2.24)

In the **Netherlands**, “the undertaking shall ensure that the equivalent or effective dose to individuals, taking account of the number of exposed individuals, due to a practice is as low as reasonably achievable. The undertaking shall ensure that, regarding the potential exposures, both the doses in the case of an exposure and the probability of an exposure is as low as reasonably achievable. With regards to this Decree and all related requirements, for the assessment of what is ‘reasonably achievable’, economical and social aspects shall be taken into account.”

In the **United Kingdom**, “every radiation employer shall, in relation to-any-work with ionising radiation’s that he undertakes, take all necessary steps to restrict so far as is reasonably practicable, the extent to which his employees and other persons are exposed to ionising radiation”.
This wording is unchanged from the previous regulations.

In **Spain**, “the magnitude of individual doses, the number of people exposed and the likelihood of incurring exposures, shall be kept as low as reasonably achievable, economic and social factors being taken into account.”

In **Finland**, “the practice shall be organised in such a way that the resulting exposure to radiation hazardous to health is kept as low as reasonably achievable.”

In **Denmark**, "all doses shall be as low as reasonably achievable."

In **Belgium**, "all exposures shall be kept as low as reasonably achievable, taking into account social and economic factors".

In **France**, "exposure of individuals to ionising radiation's shall be kept as low as reasonably possible, according to -the technical state of the art, - economic and social factors -and eventually medical goals"(Ordinance March 2001) "

In **Sweden**, "anyone who conducts a practice with ionising radiation shall ensure that the radiation protection measures are optimised, which means that exposures of people are as low as reasonably achievable, economic and social factors being taken into account."

In **Italy**, there is no new wording of the ALARA principle: the ALARA principle was already mentioned with reference to exposures of workers and persons of the public and to technical requirements the installations must fulfil.

In **Germany**, in the new Ordinance, the ALARA principle is stated unchanged and as a general guidance, which is, however, legally binding in all cases. The wording is: "… also below the dose limits, unnecessary radiation exposure or contamination of men and environment should be kept as low as possible, according to the latest technical and scientific standards and taking into consideration all conditions related to an individual case." In fact, German law promotes the "minimisation" principle together with the "principle of proportionality", which means: doses are reduced to levels as low as reasonably possible.

In **Norway**, the basic principles, justification, optimisation and dose limitation, are stated in a general article with a requirement that any human activity involving radiation sources has to be defendable. It is stipulated that the activity must be prepared to avoid acute effects and to minimise the risks for late injury as low as reasonably achievable.

In **Switzerland**, the conditions for realising the optimisation principle are described in the Radiological Protection Ordinance (art. 6).

In **Ukraine**, "critical event probability and potential exposure as well as the number of persons that could be impacted by …sources shall be as low as reasonably achievable taking into account economic and societal considerations"

Although in many cases the evolution of the optimisation principle wording is not revolutionary, it refers now explicitly to economic and social factors in many countries and as well mentions explicitly in a few cases patient exposure.

Guidance for Practical Applications

In addition to the basic regulatory requirement that exposures have to be optimised, regulators have increasingly introduced guidance on how this principle should be applied in practice.

For example, in **France**, a specific Decree concerning the protection of workers against ionising radiation (Decree n° 98-1185 modifying the Decree n° 75-306, Art. 20 bis) says, that in order to implement ALARA: "work stations which expose workers to ionizing radiation's shall be analyzed periodically to review the doses received. The frequency of these reviews must be a function of the level of the doses. In particular, during an operation in a controlled area, the manager of the plant in collaboration with the employer - if he is not the manager – is in charge of:

- a prior assessment of the collective and individual doses that might be received by workers,
- having the actual doses received during the operation registered and analyzed in order to draw conclusions from the radiation protection point of view; if it is technically possible, these measurements should be made in real time with immediate reading devices ("the operational dosimetry").

For the prior assessment of doses, the draft of another Decree specifies that "the radiation protection qualified expert in conjunction with the persons responsible for the operation, shall define individual and collective doses targets (which are not comparable to the regulatory limits)".

In the **Netherlands**, a dose prediction has to be performed by undertakings when requesting a licence and when planning work activities, with regards to members of the public off site and to workers on site. Authorities evaluate these predictions and sometimes more reduction is required. Most sites are required to give a yearly overview of the real time measures or calculations both for workers on site and for members of the public off-site.

In the **Swedish** regulations it is stipulated that, in order to demonstrate the compliance with the optimisation principle, the licence-holder shall ensure that appropriate goals and control actions are established and documented and that the necessary resources are available (*SSI Code of Statutes, SSI FS 2000:10, Regulations on Radiation Protection of People Exposed to Ionising Radiation at Nuclear Plants*). The goals and control actions shall be appropriate to the particular plant and be drawn up to take care of daily as well as long-term radiation protection. All individuals that are exposed to ionising radiation or are decision-makers in matters that affect the individual doses shall be informed of the goals and the means of control. The practice, including the goals and control actions, shall regularly be followed up and evaluated. Such evaluations shall be performed at least once a year. Documentation on the evaluation shall be sent to the Swedish Radiation Protection Institute.

In **Finland**, the radiation exposure to which workers are subjected and the factors affecting it, shall be assessed in advance, also taking into account exceptional working conditions.

In **Spain**, CSN has approved a new guide within the Nuclear Power Plants Safety Series where the main recommendations regarding the management of radiation exposure optimisation are presented. This guide comprises the ALARA responsibility assignments to all the involved parties. Besides a well established ALARA policy, it is necessary to implement a set of actions, called ALARA program, to be addressed by the licensee such as ALARA goals, work management, source term control and reduction, ALARA review of design modifications, special training and internal audits. The guide covers these aspects in a wide and flexible way to be adaptable to different circumstances. This document applies to utilities and contractors involved in all the phases of activity in nuclear power plants: design, construction, operation, dismantling and modifications.

In **Lithuania**, the Hygiene Standard HN 87 2001 requires the establishment and implementation of an ALARA programme with: - proper work organisation, - improvement of working conditions, -perfection of technological processes, -training of personnel, - implementation of quality insurance programme, - improvement of safety culture, - evaluation of influence of "human factor".

In **Slovenia,** the future law points out that "prior evaluation of the risk and optimisation of radiological protection" should be performed in all working conditions.

In the **UK**, IRR99 are supported by an Approved Code of Practice (ACoP), which has a legal significance and by Guidance material, that though having no legal significance gives a very strong indication of what is practically needed to demonstrate compliance. Prior risk assessment is mandatory in the UK: "Before a radiation employer commences a new activity involving work with ionising radiation … he shall make a suitable and sufficient assessment of the risk to any employee and other persons for the purpose of identifying the measures he needs to take to restrict the exposure of that employee or other person to ionising radiation. […] A radiation employer shall not carry out work with ionising radiation unless he has made an assessment sufficient to demonstrate that all hazards with ionising radiation have been identified;

and the nature and magnitude of the risks to employees and other persons arising from those hazards have been evaluated". The ACoP specifically requires, where relevant, the risk assessment to include several factors including "the estimated dose rates to which anyone can be exposed" and to take into account "the results of any previous personal dosimetry or area monitoring relevant to the proposed work".

In **Germany**, the Ordinance was already supported by guidelines issued by the Federal Minister of Environment. For example, the guidelines on radiation protection of maintenance and repair of work in light water reactors gives guidance on what is necessary in order to minimise doses. The estimated collective dose for each Nuclear Power Plant for the following year is required for plant personnel and contractors. If predicted collective doses are higher than 50 man.mSv, or individual doses higher than 10 mSv, specific procedures are required (job planning, step-by-step time and dose calculation, discussion with authority experts, preparation of protection actions, close supervision during the work, stopping the work and new planning if problems occur, step-by-step documentation on job time, dose values and radiological measurements).

The optimisation principle has grown into a stricter regulatory requirement in almost all new regulations, including prior dose assessment, operational dosimetry, information of stake-holders, ALARA responsibility assignments…

Limitation

Dose Limits for Deterministic Effects

There are no major changes to the limits for avoiding deterministic effects. For workers, the limit in terms of dose equivalent to the lens of the eye is 150 mSv/year (50 mSv/year for minors). In terms of dose equivalent to the skin the limit is 500 mSv/year (generally over 1 cm2 of skin instead of 100 cm^2 in the past; 150 mSv/year for under age people); and in terms of dose equivalent to the hands, forearms, feet and ankles, the limit is 500 mSv/year (150 mSv/year for under age people). In Germany, there are also organ dose limits for gonads, uterus and red bone marrow (50 mSv/year); thyroid and bone surface (300 mSv/year); colon, lung, stomach, bladder, breast, liver, oesophagus and other organs and tissues (150 mSv/year). In Germany, in specific circumstances the limit is 300 mSv for the lens of the eye, and 1000 mSv for other organs.

Dose Limits for Stochastic Effects

Table 2 gives the new individual dose limits in the countries that have already implemented the BSS, and the most recent drafted values in the other European countries that have yet to implement them.

All countries have, or will have, a dose limit for the public that is 1 mSv per year, Denmark and Finland specifying that such a limit corresponds to the contributions of all sources together. However, some countries have been or will be more restrictive with regards to each source. The Lithuania, UK, Germany and the Netherlands have introduced some constraints and specified that each source may not contribute to more than 0.2, 0.3, 0.3, and 0.1 mSv per year.

The situation is somehow different in the case of occupational exposure limits. The interpretation of the BSS has led the countries to select either 100 mSv for five years with a maximum of 50 mSv per single year (Finland, Spain, Sweden, Czech Republic, Switzerland), or to be more stringent in selecting 20 mSv per calendar year (Denmark, Germany, Italy, the Netherlands, UK, Norway) or per 12 consecutive months (Austria, Belgium, France).

One country has introduced an annual averaged dose limit of **10 mSv**:
400 mSv over the work life in Germany

Table 2. Dose Limits for Stochastic Effects (mSv)

COUNTRIES	Members of Public	"Workers A" and Major Students	"Workers B" and Minor Students	Pregnant Women and Foetus	Workers in exceptional circumstances (excluding emergency situations)
EC EURATOM DIRECTIVE 96/29	1 / year	100 / 5 years & 50 / year	6 / year	1 (foetus)	-
Austria	*NA*	*NA*	*NA*	*NA*	
Belgium	1 / year	20 / 12 rolling months	6 / year	1 (foetus) and if likely >1 women work outside controlled areas	2 x annual limits per operation / 12 rolling months & < 5 x annual limits (doses already received included)
Denmark	1 / year 0.1 / source	20 / year	6 / year	1 (foetus)	-
Finland	1 / year	100 / 5 years & 50 / year	6 / year	1 (foetus)	-
France	1 / year	*20 / 12 rolling months*	*6 / year*	*1 (foetus)*	*2 x annual limits per operation*
Germany	1 / year 0.3 / site	20 / year 400 / lifetime	6 / year	1 (foetus), 2/month (uterus)	-100 per year
Italy	1 / year	20 / year	6 / year	?	?
The Netherlands	1 / year 0.1 / source	20 / year	6 / year	unlikely > 1 (woman) **	100 / operation
Spain	1 / year 5 / 5 years *	100 / 5 years & 50 / year	6 / year	1 (foetus) & unlikely > 1 (woman) **	case by case (needs CSN approval)
Sweden	1 / year	100 / 5 years & 50 / year	6 / year	1 (foetus) **	case by case (needs SSI approval)
UK	1 / year 0.3 / source	20 / year	6 / year	1 (foetus) 13 / 3 months (abdomen equiv. dose) ***	100 / 5 years & 50 / year
INTERNATIONAL BSS (1994)	1 / year	*100 / 5 years & 50 / year*	6 / year	-	*200/10 years & 50/year (review when over 100) or 50/year renewable 5 times*
Czech Rep.	*1 / year 5/5 years **	*100 / 5 years & 50 / year*	*6 / year*	*1 (foetus) unlikely > 1 (woman) **	*50 / year ("specific circumstances") 500/5 years ("unusual events")*
Hungary	1/year	100 / 5 years			
Lithuania	1 / year 5/5 years *	100 / 5 years & 50 / year			
Norway	1 / year	20 / year	6 / year	?	?
Slovak Rep.		100 / 5 years & 50 / year			
Slovenia	*1/ year*	*NA*			
Switzerland	1 / year	100 / 5 years & 50 / year	5 / year	2 (abdomen surface effective dose)	100 / 5 years & 50 / year
Ukraine	1 / year	20 / Year **** 100 /5 years			

Italic characters: not yet implemented.

* in specific cases ; ** for the remainder pregnancy period ; *** for women of reproductive capacity; **** 20 for new facilities; 50 for operating facilities with transition to 20.

Conclusion

The full implementation of the BSS across Europe into national regulations is not far to be achieved. In addition, the principles of justification, optimisation and dose limitation have to be incorporated into a number of very different national regulatory structures. Despite this, there is evidence to suggest that all three principles will be applied across Europe in a much more consistent manner than previously, as a result of the new BSS.

Justification is probably the biggest change since it was commonly excluded from previous regulations. The optimisation principle has been translated into the different national structures in a consistent manner.

More significantly, there is increasing emphasis on applying and demonstrating optimisation in practice, in either the regulations or supporting guidance.

The flexibility in the BSS for setting effective dose limits has been reflected in national regulations. Consequently, different European countries specify either a 1 year or a 5 years effective dose limit, or a combination of both. In practice, where the optimisation principle is observed, these differences are not expected to cause practical difficulties.

The implementation of the BSS into practice appears now to be the on going challenge.

ANNEX 1. REGULATORY REFERENCES IN EUROPEAN COUNTRIES

COUNTRIES	Draft legislation	Regulatory References
Austria		Strahlenschutzgesetz, BGBl. Nr. 227/1969, last modified BGBl. Nr. 16/2000.
Belgium		Arrêté royal portant mise en vigueur de la loi du 15 04 1994 relative à la protection de la population et de l'environnement contre les dangers résultant des rayonnements ionisants et relative à l'Agence fédérale de contrôle nucléaire. 20 July 2001
Denmark	-	National Board of Health, Order no. 823 of 31 October 1997 on dose limits for ionising radiation
Finland	-	- Revised Radiation Act (1142/1998) - Revised Radiation Decree (1143/1998) +"Radiation Safety in Practices Causing Exposure to Natural Radiation" (STUK Guide, April 2000)
France	+ 2 other Decrees for the workers and the patient	- Ordinance 2001 270 28 March 2001 "relative à la transposition de directives communautaires dans le domaine de la protection contre les rayonnements ionisants" - Decree 2002 460 from the 2002.04 04 "protection générale des personnes contre les dangers des rayonnements ionisants".
Germany	Strahlenschutzverordnung + Codes of Practice	Verordnung für die Umsetzung von EURATOM-Richtlinien zum Strahlenschutz (20 July 2001)
Italy		Decreto Legislativo no 241/2000 (27 May 2000)
the Netherlands		Radiation Protection Decree (Besluit Stralingsbescherming),State Journal (Staatsblad) 2001, nr 397 of 06-09-2001. It came into force on the first of March 2002, Staatsblad 2002, nr 81 of 19-02-2002.
Spain		- Regulation of nuclear and radioactive facilities (Royal Decreto 1836/1999, 3 December 1999) - Regulation for the protection of health against ionising radiations (Royal Decreto) (20 July 2001)
Sweden		Revised Radiation Protection Act (SFS 1988:220) 13 May 2000 - Revised Radiation Protection Ordinance (Swedish Code of Statutes SFS 1988:293) + Regulations of the Swedish Radiation Protection Institute (SSI) for implementing 96/29 (29 October 1998): SSI FS 1998:3 (Categorisation of workplaces and workers at work with ionising radiation), SSI FS 1998:4 (Dose limits at work with ionising radiation), SSI FS 1998:5 (Monitoring and reporting of individual radiation doses), SSI FS 1998:6 (Medical examination for work involving ionising radiation)
United Kingdom	-	- Ionising Radiation Regulations 1999 (replaces IRR85) + Approved Code of Practices (ACoP)
Czech Republic	amendment	Act No. 18 / 1997 Coll. on Peaceful Utilisation of Nuclear Energy and Ionising Radiation (the Atomic Act) and on Amendments and Additions to Related Acts. Regulation No. 184 / 1997 Sb. of the State Office for Nuclear Safety on Radiation Protection Requirements
Hungary		16/2000 EüM rendelet/Order of HealthMinistry No. 16/2000
Lithuania		Law on radiological protection (N°WIII-1019, 1999) Hygiene Standards HN 73:2001 "Basic Standards of Radiation Protection"; 2001
Norway	-	**?** (based on ICRP 60 and IAEA BSS 115) since 1 July 2000
Slovenia	New Law on radiation and Nuclear Safety	
Slovak Republic		Radiation Protection December 2001, Ministry of Health
Switzerland	-	- Federal Act on Radiological Protection (March 1991), - Ordinance on Radiological Protection (22 June 1994)
Ukraine		"Protection of man from acting ionising radiation about" law 24 February 1998 "Radiation safety standard of Ukraine" RSSU 97 01 01 1998