Ongoing efforts of HERCA on the Harmonisation of the Radiological Monitoring Systems for Outside Workers

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Abstract

HERCA[1] is an association which brings together the Heads of 47 European Radiological protection Competent Authorities from 29 countries, in order to build and maintain a network of chief radiation safety regulators in Europe. A working group was created in 2007 to investigate on the practical implementation of the Directive 90/641/Euratom[2] and on how a better harmonisation of the radioprotection systems for outside workers could be achieved. In 2008, a survey was lead about the practical transposition of the Directive within the Member Countries. It allowed to derive the commonalities and variations of the radiological monitoring systems for outside workers and to compare the content registered in the radiation passbooks to the required information in the Directive. A model of radiological passbook was proposed by this working group, including the harmonisation of terminology and of the requirements on data content, with a distinction between mandatory fields and optional fields. The Radiation Passbook can be a paper based system but countries could also opt to use an electronic (possibly web-based) system instead of the paper based system (or parts of it). The radiation passbook is one of the first major achievements of HERCA, in its aim of harmonisation at the European level. The proposal was sent to the European Commission for its inclusion in the Basic Safety Standards (BSS) recast. Additionally, HERCA invited all European national competent authorities and stakeholders to express their comments. Furthermore, a guidance document on how to implement and use the passbook is being developed. In 2010, the working group has been given the new mandate to carry out a feasibility study for the transition to an electronic information exchange between countries for the radiological protection of workers.

Key words : HERCA, outside worker, radiation passbook, radiological monitoring system, BSS

1. Introduction

In the beginning of the 1980ies, the problem of outside workers' radiation protection within the nuclear facilities was raised. Those workers received 80% (and even more) of the collective dose from most nuclear facilities and most of the time higher individual doses than the workers of the nuclear undertakings. Outside workers' radiation protection was not explicitly taken into account into the 1980 Basic Safety Standards[3]. In 1990, the European Commission issued the Directive 90/641/Euratom in order to ensure that outside workers would benefit from the same level of protection as permanently

employed workers. Nevertheless, the practical implementation of these requirements varies considerably among the different European countries.

2. HERCA

HERCA is an association which brings together the Heads of European Radiological protection Competent Authorities. It was created in 2007 at the initiative of the French Nuclear Safety Authority (ASN). It currently brings together 47 Radiation Protection Authorities (RPA) from 29 European countries. HERCA consists of a Board of Heads and topical working groups. The highest decisionmaking body of HERCA, the Board of Heads, is composed of national representatives at managerial level appointed by the corresponding radiation protection authority. The topical working groups are composed of senior experts from the different national RPAs. Currently, there are working groups in the following domains : Outside workers & Radiation Passbook, Non-medical sources and practices, Medical Applications, Emergencies and Surveillance of collective doses from medical exposures.

The objectives of HERCA are to build and maintain a network of chief radiation safety regulators in Europe; to promote exchange of experience and learning from each other's best practices; to discuss and where appropriate, express its consensus opinion on significant regulatory issues; to develop, by consensus whenever possible, a common approach to radiological protection issues and to have an impact on the practice of radiological protection, within the Countries of HERCA members.

The association involves, as appropriate, the European Commission and other relevant stakeholders in its activities. At the occasion of the first meeting of the Heads of European Radiological protection Competent Authorities (HERCA), which took place in Paris on 29 May 2007, it was decided to create a working group to investigate on the practical implementation of the Directive 90/641/Euratom within the Member Countries and on how a better harmonisation of the radioprotection systems for outside workers amongst the Member Countries could be achieved.

3. Methodology

The working group Outside Workers and Radiation Passbook met for the first time in January 2008. Its basic objective was to ensure in an efficient way the radiological protection of both permanently employed and outside workers. For a given level of risk, radiological protection of outside workers should not be less than that of permanently employed workers.

The working group decided, as a first step, to lead a survey for the transposition of the 90/641 Euratom Directive within the Member Countries covering a series of aspects : local terminology, rights, responsibilities and obligations of the various parties, radiological monitoring system for outside workers, contents of dose register and radiation passbook, approval of dosimetry services. 23 countries participated in the survey.

In this way the commonalities and variations of the radiation monitoring systems for outside workers within the countries could be derived and compared to the required information in the Council Directive 90/641/Euratom. In addition, the national legislative difficulties in providing the information required from the directive could be identified. The results of the survey were presented in a report[2].

Based on the answers to the survey, further steps towards harmonization of the systems amongst the different countries were proposed : a common terminology, a set of good practices, the data contents of a Radiation passbook and a model of Radiation passbook.

4. Good practices used in developing a national radiation passbook and in its practical use

Good practices were identified for creating a radiation passbook and its subsequent practical use by the employer and the undertaking. These "good practices" were derived from the answers to the questionnaire, the examples of existing radiation passbooks, single use documents and experience from countries using an electronic system.

4.1 Application of the 90/641 Euratom Directive

The Directive stipulates that Member states shall establish a centralized national network or the issuing of an individual radiological monitoring document for all outside workers of category A (category B is optional), including employees, self-employed workers, students, apprentices and trainees.

On a transitional basis to a uniform system on Community level for the radiological protection of outside workers, the issuing of individual radiological monitoring documents or radiation passbooks must in any case be established by the Member States for cross-frontier outside workers of category A.

4.2 Selected definitions

The definitions should be taken from or in accordance with the definitions in the Directive, in particular for Outside worker, which should include mention of self-employed workers, students, apprentices and trainees, Employer and Undertaking.

4.3 Rights and responsibilities

The radiation passbook (or single issue document) or electronic system must enable the undertaking to

- check the dosimetric data (in order to verify the respect of the dose limits and to apply the ALARA principle), the medical fitness, and whether the outside worker needs a training specific to the activities to be carried out in the controlled areas, prior to allowing the outside worker to enter the undertaking's controlled areas.
- enter in the passbook an estimate of the radiation dose received by the outside worker in the undertaking's controlled area

The employer should have made arrangements for

- o official dosimetry (the dosimeters may be actually provided by the undertaking by arrangement)
- medical surveillance (possibly using the medical surveillance system of the undertaking by arrangement)
- basic training (the basic training may actually be provided by the undertaking by arrangement)
- any specific training needed by his employees for the work activities to be carried out in the undertaking's controlled areas. This training would normally be provided by the undertaking.
- keeping the **radiological data** of the individual exposure monitoring and the data of medical surveillance (medical fitness, date of next medical examination) of each of their workers **up to date** in the radiation passbook;
- o authorization/notification of their activities as required by national regulations.

4.4 Practical use of the passbook

- The content and the issuing procedure should follow the requirements of the regulator/issuing authority.
- The owner of the data should be the home country (of the employer). The decision of who keeps the data is up to the Member Country: (authority, employer or approved dosimetry)
- \circ $\;$ It is up the Members States to decide who can issue the passbook;
 - The passbook can be composed of different parts issued by different bodies (e.g. in some countries, parts about dosimetric and medical surveillance are issued by 2 different entities);
 - It could either be **official bodies or approved dosimetry services**.
- The employer is responsible for obtaining a radiation passbook for each of his/her outside workers.
- Non-transferability between Outside Workers should be ensured by unique identification of the worker in the passbook.
- Non-plurality can be checked by use of a register of the issued radiation passbooks (with unique serial number) coupled to a unique number identifying the worker. If each issued

document has a unique number and if it can be linked to its holder in the database, it is easy to see how much documents correspond to an individual worker. If the expiration date as well as the status (in circulation/returned) of the issued documents are also recorded in the database, one can check that a worker is not in possession of several documents. An Outside worker should only have one radiation passbook even if he has more than one employer. Consequently the passbook should allow to enter more than one employer.

- $\circ \quad Language: either \ national \ language(s) + English \ or \ national \ language(s) \ with \ code$
- The media used for the radiation passbook is up to the Member States. It can either be electronic or paper-based
- The passbook can be composed of **one document of several documents**. If it is composed of several documents, each document should not necessarily be issued by the same issuing body.
- Validity period : the document must mention its validity period if it is reusable.
- Reusability : the document should mention whether it is single use or multi-use
- The employer keeps a register of who has been authorised, on behalf of the employer, to write information into specified parts of the radiation passbook e.g. details of the current employer, date of medical review, details of official dosimetry for the current year.
- The undertaking keeps a register of who has been authorised, on behalf of the undertaking, to write information into specified parts of the radiation passbook e.g. estimated doses for activities in the undertaking's controlled areas

5. Data to include in the radiation passbook and passbook model

The content of the document (passbook or single use document) should provide all the information required by the Directive.

In order to fulfil these requirements, a list of mandatory and optional data fields were proposed by the working group. A model of radiological passbook (figure 1) has been elaborated as a tool in order to better visualize these mandatory (in black) and optional (in grey) fields. It is not obliged to use the model exactly as it is. Countries can use their own model as far as it meets the good practices given in and it contains the minimal data content (black fields).





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- national dose limits (explanation)	· ·	
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- national requirements regarding health surveillance of outside workers		
	- national requirements regarding health surveillance of outside workers	

SECTION 4 - Current employer (To be completed by the employer of the outside worker)

(Name, Identification number, Employer number, Address, Tel, Fax, e-mail	Employmer (Start date/
address)	End date)

Transforment	0	Classification	Sterrer of Alexandree
Employment (Start date/	Occupational		Stamp and/or signature or identification number
	category	(A or B)	
End date)	(see guidance)		of the responsible party
-	1	ļ	L

SECTION 5 - Health surveillance

(To be completed by the approved medical practitioner or approved occupational health service acting for the employer).

Date	Trans of	Result of a start
Date	Type of	Result (fit, not fit, fit
	Examination	subject to special
		conditions as shown)

Restrictions to work with	Validation of result	Period of
radiations	(name, signature and stamp or identification number of the approved medical practitioner, approved occupational health service or other designated instance/person)	validity of the result

SECTION 6 – Official dose record up to the radiation passbook issue date

(To be completed by the entity issuing the radiation passbook).

6.1. Occupational life time dose (mSv)

External dose						
Uniform		Non-uniform : equivalent dose to specific body location (extremities/other area's)				
ph/b * H _P (10) [a]	n ** H _P (10) [b]	Skin dose H _P (0.07)	Lens dose H _P (3)	Extremity dose []	Extremity dose []	Extremity dose []

6.2. Official doses (mSv) for the last 5 calendar years (not including the current year – mandatory for persons having a 5 year dose limit.) Year External dose

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		Uniform		Non-unif	form : eq	uivalent	dose to
				spe	cific bod	y locatio	n
				(extr	emities/o	ther area	ı's)
	ph/b	n	Skin	Lens	Extre-	Extre-	Extre-
	H _P (10)	H _P (10)	dose	dose	mity	mity	mity
	[a]	[b]	$H_{P}(0.07)$	$H_{P}(3)$	dose	dose	dose
					[]	[]	[]
Signature/stamp of the issuing							
entity	and date						

Committed effective	Inte Radio- nuclide	nal dose Dose Committed assess- equivalent dose				Effective dose (sum of	Authorized signature/ stamp of
dose from internally deposited		ment method	to specific individual organs or tissues			[a], [b] and [c])	the issuing entity and date
radionuclides [c]			[]	[]	[]		

	Inte	rnal dose				Effective dose	Authorized signature/
Committed effective dose from internally deposited	Radio- nuclide	Dose assess- ment method	Committed equivalent dose to specific individual organs or tissues		(sum of [a], [b] and [c]]	stamp of the issuing entity and date	
radionuclides [c]			[]	[]	[]		

* photon/beta - ** neutron - *** body counter, urine, faeces, air sampling,...

6.3. Details concerning the entity responsible for the record

of the official dosimetry (To be completed by the entity(ies) responsible for the record of the official dosimetry : approved dosimetry service, National Dose Register or other. Only if different from the entity issuing the passbook.)

Date	[Date]	
Responsible entity	[name of the responsible entity]	
Address	[Addr	ess of the responsible entity]
Contact perso	n	[name and job title of contact person]
Tel num	ıber	[tel number]
Fax nur	nber	[fax number]
E-mail		[e-mail address]

Date	[Date]		
Responsible entity	[name	of the responsible entity]	
Address	[Addro	ess of the responsible entity]	
Contact person		[name and job title of contact person]	
Tel num	lber	[tel number]	
Fax nun	aber	[fax number]	
E-mail		[e-mail address]	

Date	[Date]	
Responsible entity	[name of the responsible entity]	
Address	[Addre	ess of the responsible entity]
Contact person		[name and job title of contact person]
Tel num	ber	[tel number]
Fax number		[fax number]
E-mail		[e-mail address]

6.4. Official dose record for current year (mSv) (To be completed by the employer or the health physics service or other person acting for him).

him).								
Period (ddmm				l dose				
yyyy- ddmm yyyy)			Uniform	Non-uniform : equivalent dose to specific body location (extremities/other area's)				
	ph/e *	n **	Skin	Above	Under	Lens	Extre-	Extre-
	H _P (10)	H _P (10)	dose	apron	apron	dose	mity	mity
	[a]	[Ъ]	H _P (0.07)	-	-	$H_p(3)$	dose	dose
							[]	[]
TOTAL								

	Inte	rnal dose				Effective	Signature of
Committed effective dose from internally	Radio- nuclide	Dose 299000- ment method	Committed equivalent dose to specific individual organs or tissues			dose (sum of [a], [b] and [c])	the responsible person and identificatio
deposited radionuclides [c]			[]	[]	[]		n number of the employer
* nhatan/hata						acao ain can	

* photon/beta - ** neutron - *** body counter, urine, faeces, air sampling,...

SECTION 7 - Operational dose in the undertaking's

(ddmm		g's controlled area) External dose									ernal do
yyyy- ddmm yyyy)	Uniform					Non-uniform : equivalent dose to specific body location (extremities/ other area's)			Committed effective dose from internally deposited	Radio- nuclide	Dose assess- ment method
	Ph/b* H _P (10) [a]	n ** H _P (10) [b]	Skin dose H _P (0.07)	above apron	Under apron	Lens dose H _P (3)	Extre- mity dose []	Extre- mity dose []	radionuclides [c]		
Name an	d addres	s underta	aking :								
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Name an	d addres	s underta	aking :					<u> </u>			
Name an	d addres	s underta	aking :								
Name an	d addres	s underta	aking :								

 Internal dose
 Effective dose from nuclide assessment method effective dose from internally organs or tissues
 Effective dose from internally organs or tissues
 Signature/ stamp of the responsible person for [a], [b] and [c])

 internally deposited radiouclides [c]

 [...]
 [...]
 [...]
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 and [c])
 whethee the undertaking and date

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SECTION 8 – Information regarding training in radiological protection (To be filled by the person or entity responsible for the course)

8.1. Basic training in radiological protection (obligation of the employer)

Date	Number	Description of the contents
Date	of hours	Description of the contents
	of hours	

Centre or training company	Signature and stamp of the responsible for the entity or delegated person	Valid until	Observations

8.2. Specific training in radiological protection (obligation of the undertaking)

Date	Number	Description of the contents
	of hours	

Centre or training	Signature and stamp of the	Valid	Observations
company	responsible for the entity	until	
	or delegated person		
	BI		

Figure 1 : radiation passbook model

6. Stakeholder involvement and inclusion of the HERCA radiation passbook in the draft BSS recast

At the 5th meeting of HERCA in 2010, the Board of Heads approved the content for a harmonised European Radiation Passbook. This represents a milestone for the work of the association in its aim to develop a common approach to radiation safety and regulation in particular within the European Union. Such harmonisation might also be useful for non-EU European or worldwide "neighbouring" countries. HERCA considers the work as its first major achievement.

Following the approval of the harmonised European Radiation Passbook, it was sent to the European Commission proposing to include it in the last version of the BSS recast. A task group consisting of a representative of the European Commission and the Chairman of the working group included the requirements for the data content of the dose passbook for outside workers based on the work of the HERCA WG on outside workers & dose passbook in the Basic Safety Standards (version 29/09/2011). Additionally, HERCA invited all European national competent authorities and stakeholders to express their comments on its implementation at national level. Comments from stakeholders have been integrated in a new version of the dosimetric passbook approved at the occasion of the 8 th HERCA meeting held in Bern, in December 2011.

7. Future work

Transnational (and transcontinental) workforce is increasing, and therefore the number of nationalities working in one undertaking increases as well. This complexity can be partially coped with by the paper passbook system, if implemented well. However, the system has some weaknesses. It is always implemented as a means to exchange information between the undertaking and the employer (and other actors), on top of the basic data that are available in more or less fragmented ways, for example in dosimetry services, national authorities,... This increases the risk on errors or misuse. One worker could be issued with more than one passbook, for instance in two or more countries, or when they work for two or more employers. Data on one worker are kept in the national register of the country of his employer. However, when he starts a new carreer in another country, there is no guarantee that his history of doses is passed on.

In December 2010, the Board of Heads has given a new mandate to WG1. According to this mandate WG1 should carry out, in close collaboration with the EC and using the experience of ESOREX, a feasibility study for the transition from a radiation passbook to an electronic information exchange between countries. This study should define the general principles and user specifications of this

electronic information exchange. Then, starting from 2012, the EC will have the possibility to take this feasibility study as a starting point to look more closely at the technical solutions for such an electronic information exchange system.

Several possibilities were identified:

- 1. A full electronic exchange of data, in a network, could solve the problems observed with the paper passbook. Indeed, in such a way, all data concerning one worker can be brought together. However, a fully electronic system, preferably web-based to provide access to all actors involved, implies a considerable cost and effort to implement. Data privacy and encryption are important issues. To deal with business processes distributed over a large landscape of existing and heterogeneous systems that are under the control of different owners, an Enterprise Service Bus (ESB) technology in a Service Oriented Architecture (SOA) could be used.
- 2. Depending on the cost-benefit and risks, other possible options can be distinguished, that will however only solve part of the problems observed : instead of bringing together the data, a magnetic card containing his dose data could be kept by the worker. This would be a somewhat more elegant form of a paper passbook but would probably have the same deficiencies if not completed by an "issuing database", linking a unique issued passbook/magnetic card to a unique worker.
- 3. Limiting the centralization of data to solely an issuing database, coupling 1 uniquely identified worker to 1 uniquely identified passbook, is a limitative but also viable option. In this way, Member Countries are free to stick to a paper passbook or to move on to an electronic system, but multiple issuing could be prevented. It is clear that such an "issuing database" is a minimalistic solution. It could be used as a first step, but evolving to a complete electronic exchange is advisable.

Data security is a major issue. Some other issues can also be identified, such as the need for a unique identifier of the worker and privacy-related issues like identification and authentication. A magnetic card (possibly electronic ID-card) could be used as a key for identification purposes.

HERCA also intends to develop a guidance document on implementation and use of the radiation passbook.

8. Conclusions

A model of radiological passbook was proposed by a working group of HERCA on Outside workers and radiation passbook. It includes the harmonisation of terminology and of the requirements on data content, with a distinction between mandatory fields and optional fields. The Radiation Passbook can be a paper based system but countries could also opt to use an electronic (possibly web-based) system instead of the paper based system (or parts of it). The radiation passbook is one of the first major achievements of HERCA, in its aim of harmonisation at the European level. The mandatory data fields are integrated in the draft BSS recast.

The HERCA working group on Outside workers and radiation passbook is currently working on the feasibility of the transition to an electronic data exchange.

9. References

[1] HERCA, <u>www.herca.org</u>

[2] Council Directive 90/641/Euratom of 4 December 1990 on the operational protection of outside workers exposed to the risk of ionizing radiation during their activities in controlled areas

[3] Council Directive 80/836/Euratom of 15 July 1980 amending the Directives laying down the basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation

[4] Report on the progress to draft a European Radiation Passbook for Outside Workers to meet the requirements of Council Directive 90/641 Euratom,

http://www.herca.org/documents/WG1_OutsideWorkers_report_01_12_2010.pdf