



Heads of the European Radiological
protection Competent Authorities

HERCA WG1 Outside Workers & Dose Passbook

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

***Section IV of this report was endorsed by HERCA
on the 30th of June 2010***

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 operators. Outside workers' radiation protection issue was not explicitly taken into account into the 1980 Basic Safety Standards. Regarding that situation, the EC 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, and which has led to an improvement of outside workers' radiation protection.

The first Meeting of the Heads of European Radiation Control Authorities (HERCA), which took place in Paris on 29 May 2007, decided to create a working group to investigate on the practical implementation of the Directive 90/641/Euratom within the Member States (MS) and on how a better harmonisation of the radioprotection systems for outside workers amongst the MS could be achieved.

The working group met for the first time on January 24th 2008 and decided that the first step was to lead a survey for the transposition of the 90/641 Euratom Directive within the MS. This survey has been based on the answers of various countries to a questionnaire prepared by the working group (see questionnaire in annex I). 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. The results of the survey are presented in the first part of this document.

Based on these results, further steps towards harmonization of the systems amongst the different countries are proposed in this document. The concrete results of this analysis are the good practices, the data contents of a Radiation passbook and a draft Radiation passbook. In the first instance the Radiation Passbook would be a paper based system. However, countries could opt to use an electronic (possibly web-based) system instead of parts of the paper based system.

The actual document is to be presented for endorsement (approval) by the participants of the Heads of European Radiation Regulatory Authorities Meeting.

I. Objectives of the HERCA WGI

The basic objective is 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

In this framework, we planned:

- To establish what the commonalities and variations are within the countries represented at the meeting of the Heads of European Radiation Control Authorities.
- To compare what each country has in its system for outside workers against the required information in the Council Directive 90/641/Euratom
- To identify national legislative difficulties in providing the required information
- Establish a good practice guide
- Harmonize terminology
- Harmonize the requirements on data content in the radiation passbook:
 - A single format of document for outside workers across borders could be useful but is optional
 - However, a list of mandatory fields should be established (based on annex I of the European Directive but including guidance on what is meant by the wording of the Directive), leaving some data optional to allow Member States some flexibility, for example :
 - The radiation passbook should include information on the date of the last periodic health review and the medical classification in an uniform way
 - Particulars concerning the outside workers' identity should include first name, surname, sex, date of birth, unique optionally (middle names,...)
- Provide guidance about where the data should be stored for a worker : the owner of the data should be the home country (authority, outside undertaking or approved dosimetry service: The decision of who keeps the data is up to the Member State).
- Harmonisation might also be useful for non-EU European or worldwide "neighbouring" countries
- A stepwise approach should be used to weight the cost & benefit of harmonising the dose passbook
- Establish a protocol for exchanging information between the countries
 - By conventions
 - Centralized system

II. Survey

1. Transposition of the directive into national laws in various countries

The vast majority of the countries (all except Norway) participating in the survey (see table 1) declared that they had transposed the directive into their national law. This is also the case for Belgium. However Belgium has not yet put into practice all the directive's provisions although this situation is currently changing.

In the case of Norway, where the directive has not been implemented, it was mentioned that the country's general regulations on radiation protection also cover outside companies operating on Norwegian territory. Consequently, Norway did not reply to the rest of the questionnaire. The remainder of the survey is therefore based on the answers of the other 22 participants.

Annex II contains a list of the references of the national laws transposing the directive.

Table 1. List of countries participating in the survey:

Participating countries
Austria
Belgium
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Ireland
Latvia
Lithuania
Netherlands
Norway
Poland
Portugal
Slovakia
Slovenia
Spain
Sweden
Switzerland
United Kingdom

2. Local terminology

In order to be able to interpret correctly the answers given by participants, it is essential to see whether there are any divergences from the point of view of the legal terminology used for outside undertakings, outside workers and operators.

Outside worker

The definition used in the directive is as follows: “*outside worker*’ means any worker of category A, as defined in Article 23 of Directive 80/836/Euratom, performing activities of any sort in a controlled area, whether employed temporarily or permanently by an outside undertaking, including trainees, apprentices and students within the meaning of Article 10 of that Directive, or whether he provides services as a self-employed worker”.

Three countries have used the directive’s definition as it is: Belgium, Hungary and Latvia. The definitions used in Estonia, France, Spain and Poland are also very close to that used in the directive.

The various laws do not systematically stipulate that outside workers must be *employed by an outside undertaking* or be *self-employed* but it is always clear from the definitions that the worker is not part of the workforce of the operator for which he or she carries out the activities (that is the case of the following 12 countries: Austria, the Czech Republic, France, Germany, Greece Lithuania, Netherlands, Portugal, Slovakia, Sweden, Switzerland and the UK).

Approximately a third of the countries (9 out of 22: Belgium, Finland, Greece, Hungary, Lithuania, Estonia, Portugal, Spain and Sweden) include explicitly *students, apprentices and trainees* in the definition of outside workers.

As regards the reference to the *category* of workers, the majority (12 out of 22: Austria, Czech Republic, Estonia, Greece, Hungary, Ireland, Latvia, Lithuania, Netherlands, Poland, Slovakia, Spain) mention explicitly that it involves category A workers. In Spain, the law even explicitly specifies that it can involve category A or B workers. The UK uses the term “classified worker” in place of “Category A worker”. In Germany, it is mentioned that it concerns workers that can be exposed with more than 1 mSv per year. Finland, Belgium, France, Slovenia, Sweden and Switzerland do not explicitly mention categories either. For France and Belgium it means it covers both categories and the same can be interpreted for the 4 other countries.

For most countries it is clear that the activities must be carried out in a *controlled area*. Finland and France specify that the activities concern radiation work (*Radiation work has been defined in Finland as ‘work in which exposure of a worker might exceed any of the dose limits for the member of the public’*). Switzerland simply specifies that the worker will be exposed during his or her activities.

Outside undertaking

Definition in the directive: “*‘outside undertaking’ means any natural or legal person, other than the operator, including members of his staff, performing an activity of any sort in a controlled area.*”

The majority of countries have used the above definition as it is apart from a few details in some cases (or local specificities) (15 out of 22 countries: Austria, the Czech Republic, Belgium, France, Hungary, Latvia, Lithuania, Netherlands, Estonia, Portugal, Slovakia, Slovenia, Sweden, Spain and Germany). The definition used in the Czech Republic and Lithuania indicates that in these 2 countries, outside undertakings are subject to the same system of authorisations as operators.

Just over a quarter of the countries (5 countries: Finland, Ireland, Switzerland, the UK and Poland) define an outside undertaking simply as the employer of outside workers.

Operator

Definition in the directive: “*operator` means any natural or legal person who under national law, is responsible for a controlled area in which an activity required to be reported under Article 3 of Directive 80/836/Euratom is carried on.*”

Most of the countries have adopted a definition that is very close to that of the directive. The concept of operator is generally understood in the same way even if sometimes the term used differs from “operator”, as in Poland where the term used is “organisational entity”. In the UK the term “operator” is not defined and the term used is “employer in control of the work area”. Estonia is the only country where the concept of operator is completely missing from the law, although the concept of “radiation practice” is clearly defined.

In Finland, the operator is the party responsible for the use of radiation sources. Responsible party includes the licensee, any business or sole trader, enterprise, corporation, foundation of institution which uses radiation sources in its operations, any employer or self-employed person engaged in radiation practices.

In Switzerland, the definition does not specify whether or not the operator is subject to an authorisation in accordance with a legal provision pursuant to article 3 of the 80/836 Euratom directive.

In practice, who is considered as an outside worker?

In most of the countries participating in the survey (all except Estonia), *self-employed workers* who are exposed in a controlled area during their activities for an operator are considered to be outside workers.

A large majority of countries (13 out of 22) consider *exposed workers who are employed by several outside undertakings (that are also operators)* at the same time as outside workers.

More than a quarter of participants (7 out of 22 countries: Finland, France, Hungary, Germany, Spain, Belgium and Switzerland) consider category B workers included in the definition of outside workers. That is also the case of Slovenia except for medical doctors regularly employed in several institutions, where each employer is fully responsible for the radiological protection of its employees.

3. Rights, responsibilities and obligations of the various parties

3.1. The operator's right to be provided with the relevant exposure data of the outside workers to meet national requirements on doses limits

In order to ensure the radiological protection of outside workers, the directive lists a certain number of measures to be implemented in the various Member States. The system of protection put in place must in particular enable the operator to have access to the exposure records of outside workers before they enter a controlled area under its responsibility.

In France, it is difficult to implement this aspect of the directive because radiological data are considered as protected by their rules of medical confidentiality and to prevent discrimination. Employers are not allowed to know the nominative doses of their workers. Only the occupational physician has access to all the doses of the workers he is in charge. The radiation protection officer (in French "*personne compétente en radioprotection*") designed by the employer has access to the last 12 consecutive months effective doses (passive and operational dosimetry) of the workers he is in charge. Operator and outside undertaking, as well as occupational physicians and radiation protection officers of both, must be in relation on the subject.

3.2. Reporting or authorisation systems for outside undertakings

Article 3 of the directive stipulates that: "*Each Member State shall make the performance of the activities referred to in Article 2 of Directive 80/836/Euratom by outside undertakings subject to reporting or prior authorization as laid down in accordance with Title II of the aforementioned Directive, in particular Article 3 thereof*".

The situation varies considerably from one country to another:

In some Member States (9 out of 22), outside undertakings are subject solely to a *system of prior reporting* as in Belgium, Denmark, Germany, Greece, Hungary, Netherlands, Poland, Slovakia and Spain (where they must be entered in a special register).

In some countries (about one third of the participants) they must only be *authorised*: the Czech Republic, Estonia, Ireland, Latvia, Portugal and Switzerland.

In other countries (about one quarter of the participants), they are *subject to the 2 systems*: Austria, Lithuania, Slovenia, Sweden and the UK. In Slovenia, outside undertakings must carry out a risk analysis to assess whether workers are likely to receive more or less than 1 mSv per year. Below 1mSv, notification is sufficient, but above that level an authorisation is required. A similar situation applies in the UK, where an authorisation is only required for certain specific practices.

In Finland, all use of radiation is subject to reporting or prior authorization. It does not matter if the user is the operator or outside undertaking. The licensee can be the employer or outside undertaking who has statutory representation in Finland.

In France, the outside undertakings operating in nuclear installations have to be certified by a French organism of certification (CEFRI) which guarantees that all requirements concerning the radiation protection are respected. The outside undertakings working in all activities using radioactive sources or sources of ionising radiations for medical, industrial or research purposes are subject to reporting or authorization.

3.3. Responsibilities of the operators and outside undertakings

The directive divides the responsibilities between operators and outside undertakings as regards the radiological protection of outside workers as follows:

Article 5 stipulates that:

" Outside undertakings shall, either directly or through contractual agreements with the operators, ensure the radiological protection of their workers in accordance with the relevant provisions of Titles III to VI of Directive 80/836/Euratom, and in particular:

- (a) ensure compliance with the general principles and the limitation of doses referred to in Articles 6 to 11 thereof;*
- (b) provide the information and training in the field of radiation protection referred to in Article 24 thereof;*
- (c) guarantee that their workers are subject to assessment of exposure and medical surveillance under the conditions laid down in Articles 26 and 28 to 38 thereof;*
- (d) ensure that the radiological data of the individual exposure monitoring of each of their workers within the meaning of Annex I, part II to this Directive are kept up to date in the networks and individual documents referred to in Article 4 (2)."*

and article 6 stipulates that:

"1. The operator of a controlled area in which outside workers perform activities shall be responsible, either directly or through contractual agreements, for the operational aspects of their radiological protection which are directly related to the nature of the controlled area and of the activities.

2. In particular, for each outside worker performing activities in a controlled area, the operator must:

(a) check that the worker concerned has been passed as medically fit for the activities to be assigned to him;

(b) ensure that, in addition to the basic training in radiation protection referred to in Article 5 (1) (b), he has received specific training in connection with the characteristics of both the controlled area and the activities;

(c) ensure that he has been issued with the necessary personal protective equipment;

(d) also ensure that he receives individual exposure monitoring appropriate to the nature of the activities, and any operational dosimetric monitoring that may be necessary;

(e) ensure compliance with the general principles and limitation of doses referred to in Articles 6 to 11 of Directive 80/836/Euratom;

(f) ensure or take all appropriate steps to ensure that after every activity the radiological data of individual exposure monitoring of each outside worker within the meaning of Annex I, Part III, are recorded. "

In addition, article 7 stipulates that *« Every outside worker shall be obliged to make his own contribution as far as practicable towards the protection that the radiological monitoring system referred to in Article 4 is intended to afford him. ».*

Responsibility for the official dosimetry

The directive stipulates that *the outside undertaking guarantees that their workers are subject to assessment of exposure (either directly or through contractual agreements with the operator) and that the operator ensures that the individual exposure monitoring is appropriate to the nature of the activities.*

Once again, the situation in this regard varies considerably from one country to another:

In some countries, the outside undertaking is responsible for this aspect but can delegate this task through a contractual agreement to the operator while retaining official responsibility. This is the case in Ireland, Netherlands, Poland, Portugal, Slovenia, Spain and the United Kingdom.

In France, in Germany and in Greece, this role is exclusively reserved for the outside undertaking.

In certain countries (Austria, Hungary, Estonia and Lithuania) the 2 parties are officially responsible, but these responsibilities can be divided between the parties through a contractual agreement as in Estonia and Lithuania.

The majority group corresponding to half of the participants make the operator responsible for the official dosimetry. That is the case in the Czech Republic, Denmark, Latvia, Sweden, and Switzerland. It is also the case in Belgium, Slovakia and Finland, but in these 3 countries, in certain situations, the provision of the dosimetry can be delegated contractually to outside undertakings.

Medical surveillance

The directive stipulates that *the outside undertaking guarantee that their workers are subject to medical surveillance (either directly or through contractual agreements with the operator) and that the operator checks that the worker concerned has been passed as medically fit for the activities to be assigned to him.*

In this regard, approximately two-thirds of participants (17 out of 22: Austria, Belgium, the Czech Republic, Denmark, France, Germany, Greece, Lithuania, Netherlands, Poland, Portugal, Slovakia, Spain, Switzerland, Ireland, Slovenia and the UK) tend to put the responsibility on the outside undertaking. In the UK the responsibility is also placed on the Licensee of a Nuclear Site.

Ireland, Slovenia, the UK and Belgium specify that it is possible, in certain situations, to delegate the medical surveillance to operators by means of a contractual agreement. However, in the case of the last country, for activities in class I type facilities (like nuclear power plants), the operator is always officially responsible for the medical surveillance inside his facility.

Hungary and Sweden put this responsibility on the operator. That is also the case in Finland where this responsibility can be delegated through contractual agreements to outside undertakings in certain cases.

In Latvia and Estonia, the 2 parties are legally responsible. Contracts are sometimes signed between the 2 parties to specify the division of responsibilities.

Training

The directive stipulates that *the outside undertaking provides the (basic) information and training in the field of radiation protection (either directly or through contractual agreements with the operator) and that the operator ensures that, in addition to the basic training in radiation, he has received specific training in connection with the characteristics of both the controlled area and the activities;*

For a large majority of participants (15 out of 22), the outside undertakings are officially responsible for basic information with regard to the radiological protection of workers. Three of them specify that this responsibility may be delegated to operators in certain cases (Belgium, Ireland, Slovenia).

The following 4 countries put this responsibility on the operator: Sweden, Hungary, Portugal and Finland. However, in Finland, the task can be delegated through contractual agreements to outside undertakings.

In Estonia, Latvia and Germany, this responsibility is shared between the 2 parties.

4. Radiological monitoring system for outside workers

4.1. The directive's stipulations

The directive outlines guidelines for setting up a radiological monitoring system for outside workers:

- Article 4, point 2, stipulates that:

« ...2. Pending the establishment, at Community level, of a uniform system for the radiological protection of outside workers, such as a computer network, recourse shall be had:

(a) on a transitional basis, in accordance with the common provisions set out in Annex I, to - a centralized national network, or - the issuing of an individual radiological monitoring document to every outside worker, in which case the common provisions of Annex II shall also apply;...».

- Annex I describes the provisions common to the networks and individual documents referred to above.

Part I of this annex lists the main aspects of the system (in particular as regards content):

«1. Any radiological monitoring system of the Member States for outside workers must comprise the following three sections:

- particulars concerning the outside workers' identity;*
- particulars to be supplied before the start of any activity;*
- particulars to be supplied after the end of any activity.*

2. The competent authorities of the Member States shall take the measures necessary to prevent any forgery or misuse of, or illegal tampering with, the radiological monitoring system.

3. Data on the outside worker's identity must also include the worker's sex and date of birth».

Part II of this annex stipulates the data to be provided before the start of an activity by the various parties in the framework of the system:

« Before the start of any activity, the data to be supplied via the radiological monitoring system to the operator or his approved medical practitioner by the outside undertaking or an authority empowered to that end must be as follows:

- *the name and address of the outside undertaking;*
- *the medical classification of the outside worker in accordance with Article 35 of Directive 80/836/Euratom;*
- *the date of the last periodic health review;*
- *the results of the outside worker's individual exposure monitoring».*

and Part III stipulates the data to be provided after the end of an activity by the various parties in the framework of the system:

« The data which the operator must record or have recorded by the authority empowered to that end in the radiological monitoring system after the end of any activity must be as follows:

- *the period covered by the activity;*
- *an estimate of any effective dose received by the outside worker;*
- *in the event of non-uniform exposure, an estimate of the dose-equivalent in the different parts of the body;*
- *in the event of internal contamination, an estimate of the activity taken in or the committed dose».*

4.2. Types of systems used in various countries

Almost all the countries having participated in the survey have set up systems corresponding to different degrees to the minimum requirements stipulated in the directive.

Most of the participating countries having a system use one (or more) *paper documents or a passport* in combination with a centralised database for the dosimetric monitoring of all exposed workers (and therefore implicitly outside workers) or solely for outside workers (like for Slovakia). In Switzerland, in addition, at the same time, there is a centralised database for the results of the medical surveillance of exposed workers.

In France, the individual monitoring system includes the combined use of a paper-based system (named the medical card) and a centralised national database (named SISERI). The medical card does not hold any dose data. All radiation workers of category A and B including outside workers have a medical card. This card constitutes their identity card of radiation exposed worker. It includes the identity of the worker (name, surname and the national identity number), a national number of exposed workers, the name of the employer, the name of the occupational physician in charge of the medical surveillance and the validation (date + signature) of each medical visit. The French national database centralises all dosimetric results (passive dosimetry, active personal dosimetry, internal monitoring exposure) for all workers including outside workers and cross-border workers during their work in France. It also ensures the record keeping of French aircrew dosimetry. The SISERI information system provides occupational physicians and radiation protection officers with dosimetric data of their workers via a secure access.

Slovenia use solely the centralised database containing the dosimetric data of all exposed workers by way of a system of radiological protection for exposed outside workers. In the Slovene database, it is possible to ascertain whether a given worker is an outside worker. We do not have any information as to whether this database can, as in France, be used via the Internet by the various parties to the system in order to ensure the follow up of an outside worker performing activities within the country. However, we know that no additional paper radiation passport has been implemented for Slovenian workers going abroad. In those cases, dose reports are issued on written demand and when an outside worker is back in Slovenia, the relevant dose must be conveyed to the National database.

Belgium has a centralized national register but it does not allow yet to be used by the outside undertakings and operators to fulfil their obligations as stipulated in part II and III of the Council Directive. Belgium is currently developing a centralised register for all exposed workers, including outside workers. The centralized register can serve for the follow up of external workers carrying activities for Belgian operators. For outside workers performing activities abroad, the system will be completed by a paper passbook system. Belgium is currently updating its system and has answered the rest of the questionnaire taking the system in developing into account. From now the sign "*" will always follow the word "Belgium" in order to keep this in mind while looking at the answers for this country.

In Ireland, the radiological monitoring of outside workers is apparently based entirely on a paper system.

4.3. Competent authorities in charge of the radiological monitoring system for outside workers

Table 2 lists the competent authorities with responsibility for the radiological monitoring system for outside workers put in place in the various participating countries.

Table 2. Competent authorities in charge of the radiological monitoring system for outside workers in the participating countries

Member State	Institution in charge of RP system for outside workers
Austria	Federal Ministry of Agriculture, Forestry, Environment and Water Management
Belgium	Federal Agency for Nuclear Control (FANC)
Czech Republic	Czech Regulatory Authority. Passports are provided by The State Office for Nuclear safety (SÚJB)
Denmark	National Institute of Radiation Protection (SIS)
Estonia	Estonian Radiation Protection Centre (ERPC)
Finland	STUK
France	Institut de radioprotection et de sûreté nucléaire (IRSN)
Germany	The local competent authorities (62 local registration offices + 1 central registration office, the German Radiation Protection Register)

Greece	The Personal Dosimetry Department of Greek Atomic Energy Commission
Hungary	Health Ministry. Passport edited by National Service for Personal Dosimetry
Ireland	The Radiological Protection Institute of Ireland (RPII)
Latvia	Approved dosimetry service
Lithuania	Radiation protection Centre.
Netherlands	NRG Arnhem
Poland	The President of National Atomic Energy Agency (NAEA)
Portugal	General Directorate for Health (DGS)
Slovakia	Public Health Authority of the Slovak Republic
Slovenia	SRPA
Spain	CSN (Nuclear Safety Council)
Sweden	Sweden nuclear industry. Passports must be asked to Swedish Radiation Protection Authority, SSI
Switzerland	Federal Office of Public Health (Central database of the results of the dosimeter place to apply for passport) Swiss National Accident Insurance Fund (Database of the results of the medical tests)
United Kingdom	Health and Safety Executive (HSE)

4.4. Outside workers concerned by the system

Activities performed in the home country or abroad

In most countries (17), the radiological protection system/passport must be applied to outside workers performing activities in both their own country and abroad.

Some countries made the observation that workers performing activities in other countries are usually required to present their passport to the operator of the facility in which they perform their activities. However, experience shows that, in most cases, foreign operators are reluctant to enter data into the radiological passport, due mainly to difficulties with the language.

In these situations, once the activities have finished, the doses resulting from such activities are entered into the radiological passport by the outside undertaking.

In Finland and Hungary, the paper system applies only to outside workers performing activities abroad, while in Ireland the system applies only to workers performing activities in their own country (to be checked, inconsistency with point 4.6). Similarly, in the Netherlands, the passport is not used for domestic workers.

Restriction to certain outside workers

The Czech Republic stipulates that only outside workers employed by authorised outside undertakings are subject to the system. Apparently, therefore, self-employed outside workers are not subject to the system.

Poland limits the application of the system to outside workers who apply for a passport.

Spain has drawn attention to the following situation in this regard: *"The legal provisions for outside workers in Spain apply to both nuclear and radioactive facilities; however, in practice, the radiological passport is much better implemented in nuclear facilities than in radioactive facilities.*

In radioactive facilities, the legal provisions for outside workers apply mainly to those companies that provide technical assistance to such facilities. In general these companies fulfil their duties as outside undertakings and, therefore, they register in the National Registry and provide their workers with a radiological passport.

However, the licensees of the facilities to which these companies provide assistance usually do not require the radiological passport as a necessary condition to work in controlled areas. The reason for this is that, in Spain, these technical assistance companies require prior authorization to perform their activities. The authorization granted to these companies contains a condition which makes the holder of the company responsible for all the aspects related to the radiological protection of its workers. That means that the holder of the technical assistance company is directly responsible for:

~Ensuring compliance with ALARA principle and dose limits.

~Ensuring that the workers are provided with appropriate dosimetry.

~Ensuring that the workers are provided with appropriate protective equipment.

~Ensuring that the workers have received the basic and specific training in radiation protection."

Therefore, the licensees of the radioactive facilities in which these workers perform their activities have in practice no additional responsibilities regarding their radiological protection. In this context, the radiological passport seems not to be an essential element to ensure the radiological protection of these workers.

Sweden only has a radiological passport for outside workers in the nuclear sector.

4.5. Who provides workers with the individual radiological monitoring document?

In most of the countries (13 out of 20) using a paper system, the outside undertakings provide workers with the individual radiological monitoring document. In Estonia and Slovakia, the document is issued to workers either by the operator or by the outside undertaking, whereas in Latvia only operators provide outside workers with the document. Apparently, it is the authorised dosimetry service which issues the passport directly to workers in Hungary, while in Sweden and the Netherlands it is the authority in charge of the system which issues the passport directly to workers. In the UK, the dosimetry services are issuing the passbooks.

In France, IRSN manages medical cards by sending them to occupational physicians who fill in and deliver them to the workers. Then, IRSN ensures the registration of these medical cards. The dose results can be extracted and printed from the database SISERI by the radiation protection officer and the occupational physician for the workers they are in charge.

4.6. Does the individual radiological monitoring document follow the worker in his changing of employment?

For the countries making use of a “paper” system, the document follows the worker:

- for the changing of employer inside the country and outside as in Estonia, Latvia, Greece, Poland, Spain, and Switzerland.;
- only for the changing of employer inside the country as in Austria, Czech Republic, Germany, Slovakia, and the United Kingdom;
- only for the changing of employer outside the country as in Hungary and Ireland (only if it is required by the operator).

Sweden did not provide any answer on this subject.

In Denmark, Finland and Lithuania, the individual radiological monitoring document is a single use document. In Finland, STUK issues the individual radiological monitoring document, that follows the Finnish worker only outside the country. This system is also used in the Netherlands; the authority is NRG-Arnhem.

In France, the medical card follows the worker, when the employer changes.

4.7. Unique number of the radiological document

The majority of the country making use of a “paper” system (all except Sweden and Switzerland) attribute a single number to each issued passport/document.

4.8. Register of the issued radiological documents

For the majority of the countries (17 out of 22), there exists a register for the issued radiological documents/passports. For 9 of them (Belgium*, Czech Republic, Denmark, Estonia, France, Finland, Lithuania, Netherlands and Poland), it is mentioned that it is contained in the national centralized database for the dosimetry of the exposed workers.

In the 3 following countries, no register is held for the issued radiological documents: Switzerland, Sweden and the UK.

4.9. Non-transferability

In the various countries, in order to ensure the non-transferability of the radiological document, information (see examples in the list below) on the identity of the worker is reported in the document. In some countries, this information could be checked by the operator by comparison with the identity card of the outside worker before his intervention in the controlled area.

- Picture

- Personal data of the worker (name(s), first name(s), adresse(s), birth date, nationality, birthplace...)
- Signature
- National register/identity number (sometimes the n° of identification of the passport is directly based on the national register number)
- ...

4.10. Non-plurality

Non-plurality is often ensured thanks to a unique identification number of the document and a centralized register of the issued radiological documents/passports held and managed by the competent authority/organization.

Another means to avoid that several radiological documents are used at the same time by an outside workers is that the request for a new document can only be introduced if the previous one has been returned (as it is the case in Finland and Netherlands).

In Denmark, a worker might have more than one passport but not for the same controlled area. If he already has one passport to a certain area, he will not be able to get a new to the same area.

In Belgium, for outside workers carrying activities inside the country, non-plurality is automatically ensured since the system is centralised and electronic. For outside workers going abroad, the outside undertaking can print out a paper document from the register. Before printing out this document he will have to introduce de name of the foreign operator(s) + the period(s) of the activities to this (these) operator(s).

4.11. Language of the document

The great majority of the non English-speaking countries (15 out of 20) use English in addition to the national language(s) in the radiological document.

4.12. Validity period

The validity period changes from one country to another. Seven of the 20 countries with "paper" system impose fixed validity period (Spain, Austria, Czech Republic, France (for the medical card), Germany, Greece, Sweden) going from 6 months (Sweden) for the shortest one up to 10 years for longest one (Czech Republic en Greece).

Seven of the 20 of the countries using a "paper" system do not mention limits for the validity (Estonia, Hungary, Latvia, Lithuania, Poland, Switzerland, Ireland). In the United Kingdom, the passport is used as long as space is remaining to note the data.

Finally, for the 5 remaining countries, there exists limits for the validity but these are not fixed. In Denmark, it can go from a few days up to one year, in Slovakia it

cannot exceed 5 years and in Finland and Netherlands, it depends on the working time abroad (multiple operators possible). It has to be sent back to the regulatory authority before the work begins in Finland and the Netherlands. In Belgium, it will be given by the end of the last period of activities pre-registered in the document at the moment of issuing.

4.13. Document reusable or aimed for a single use

This question has probably been unclearly formulated since the answers (or absence of answers) received from 4 countries to that question show that it was not understood (Austria, Greece, Hungary, Estonia). Therefore no information about this topic is available for those 4 countries.

For most of the countries (10 over 20) the document is *reusable*: Belgium*, Czech Republic, Germany, Latvia, Poland, United-Kingdom, Spain, Slovakia, Switzerland, Finland (can be reused until the worker works again in Finland).

In Ireland, the regulations imply a duty of care on the outside undertaking to maintain and not dispose of returned passports. Passports could be reused where the outside worker takes up employment again with the same undertaking so long as all of the record maintenance requirements are met.

For Denmark, Lithuania, Netherlands and Sweden, the document is aimed at *one single use*. This can be considered as an extract of the Dose Register which may be disposed once the work in a particular facility has been completed.

4.14. Additional information

For most of the countries (except for Estonia, Greece and Hungary) making use of a paper based system, the document contains *guidelines in order to fill it in*.

For half of the countries with a paper system, the document also contains information about its *aim* and about the *legal provisions relative to the system of radiological surveillance of outside workers*: Austria, Belgium*, Czech Republic, Denmark, Germany, Hungary, Ireland, Netherlands, Slovakia, Spain.

Other kind of information has been added like for instance in Spain the conditions for the issuance and renewal of the passport or the actions to be taken in case of loss or damage of the passport.

5. Sections of the radiological document/data base

5.1. Identification of the worker

5.1.1. Content

For the countries that developed a system of radiological surveillance for the outside workers (or that are developing a system like for Belgium), *first name, last name and sex* of the worker are almost always specified. The *date of birth* is specified everywhere except in Latvia. One third of the countries provide a *photograph* (Belgium*, Czech Republic, Greece, Ireland, Latvia, Slovakia, Spain). About half of them give the *home address* of the worker.

Almost all of them (except in Hungary and not mandatory in Slovenia provide a *unique identification number* for the workers, most of the time this number is identical to the national identity number. In Czech Republic and in France, this number corresponds to the unique number identifying the workers inside the centralized database. In the UK, it corresponds to the National insurance number and in France to the social security number. Only half of the countries provide an *identification number for foreign outside workers* (Belgium*, Czech Republic, Estonia, Latvia, Lithuania, Poland, Slovenia, Spain).

Other information is sometimes given like for instance: mother's name, title (Mr, Mrs, Ms, Dr), place of birth, signature of the worker, nationality, phone/e-mail details, details of contact person to be contacted in case of emergency, category of the worker, profession, type of work, ...

5.1.2. Who is responsible to fill the data regarding the identification of the worker?

The responsible to fill in this section vary from one country to the other (see table 3 below) : the outside undertaking (in 4 countries), the accredited dosimetry services (ADS) (in 6 countries) or the body or instance issuing the passport (in 11 countries).

Table 3. Responsible to fill in the section about the identification of the worker

	worker	Outside undertaking	ADS	other
Austria		yes		
Belgium*				FANC
Czech Republic				The State Office for Nuclear safety (SÚJB)
Denmark			yes	
Estonia			yes	
Finland				STUK
France				Occupational physician ADS Radiation Protection Officer

Germany				Competent authorities
Greece	yes			
Hungary			yes	
Ireland				Not explicit in legislation
Latvia		yes		
Lithuania				Radiation Protection Centre
Netherlands		yes		
Poland				President of National Atomic Energy Agency
Portugal			yes	
Slovakia				National register
Slovenia			yes	
Spain		yes		
Sweden				Swedish Radiation Protection Authority (SSI)
Switzerland		yes		
United Kingdom			yes	

5.2. Identification of the outside undertaking

5.2.1. Content

For all the countries, *name and address* of the outside undertaking are provided.

More than half of the countries (14 over the 22), an *identification code* for the outside undertaking is provided (See table 4 below).

More than half (12 over 22) of the countries indicate the period of employment in an outside undertaking. It goes about the same proportion (12 over 22) for the countries indicating history regarding the changes of employment. (See table). Sometimes other information is also given such as contact details for the outside undertaking, signature of the outside undertaking or the activity sector to which the outside undertaking is belonging.

Table 4. Identification data for outside undertaking

	identification code	begin/end dates of employment	history regarding changes of employment
Austria	yes	yes	yes
Belgium*	yes (=KBO-BCE number)	yes	yes
Czech Republic	yes (=licence number)	yes	yes
Denmark			
Estonia	yes (+ licence number)		yes
Finland		yes	yes
France	yes		yes
Greece	yes	yes	yes
Germany		yes	yes
Hungary	yes		
Ireland			
Latvia	yes		
Lithuania	yes		
Netherlands	yes	yes	
Poland			
Portugal	yes (number of authorization)		
Slovakia	yes	yes	yes
Slovenia	yes	yes	yes
Spain	yes (number of Registration in the National Registry of Outside Undertakings + fiscal identification code)	yes	yes
Sweden			
Switzerland	yes (number of the authorization)	yes	yes
United Kingdom		yes	yes

5.2.2. Who is responsible to fill the identification data for the outside undertaking?

For most of the countries (12), the outside undertaking is responsible to fill in this data (see table 5 below). For Denmark, Estonia, France and Slovenia, an approved dosimetry service fills in this section. This can also be done by the competent authority like in Lithuania or Slovakia (national dose register).

Table 5. Responsible to fill in the identification data for the outside undertaking

	outside undertaking	approved dosimetry service	other
Austria			BMLFUW
Belgium*			FANC
Czech Republic	yes		
Denmark		yes	
Estonia		yes	
Finland	yes	yes	
France		yes	
Greece	yes		
Germany	yes		
Hungary	yes		
Ireland			Radiation Protection Officer
Latvia	yes		
Lithuania			Radiation Protection Centre
Netherlands	yes		
Poland			
Portugal		yes	
Slovakia			National register
Slovenia		yes	
Spain	yes		
Sweden	yes		
Switzerland	yes		
United Kingdom	yes		

5.3. Identification of the operator

5.3.1. Content

A section for *the identification of the operator* is provided for most of the countries. Only Ireland, Estonia and Latvia do not provide such a section in their passport model. By the way, as will be seen later Estonia and Latvia neither provide a section

for operational dosimetry data (= doses received during the period of activity to an operator) into their passport model.

Only 6 countries indicate an *identification code* for the operator: Belgium*, Czech Republic, France, Poland, Slovakia, Slovenia.

Hungary, France and Lithuania are the only countries for which there is no provision to indicate the *period of the activity* (begin/end dates) carried out on the operator's site.

Sometimes *other information* is provided in this section like for instance the signature/stamp of the operator, the contact details of the operator (or those of a delegated person of contact like for instance the radiation protection officer). For UK, the name and signature of the person entering the information and acting for the outside undertaking in control of the area and the date of putting the entry must also be entered into this section. For Switzerland, the dose limit set by the outside undertaking, which should not be passed during the period of the outside activity must also be entered into the section.

5.3.2. Who fills in the data regarding the operator

For most of the countries who dedicate a section for the operator (10 over 19), exclusively the operator fills in the section (see table 6 below). In Germany, this part can be filled either by the operator or by the outside undertaking on the basis of a contract. In Finland (where the radiological monitoring document only concerns workers going outside Finland), this part can be filled either by the operator or by the approved dosimetry service in that country which is in charge of executing the dosimetry for the workers of that operator.

In Slovenia, this is exclusively filled by the approved dosimetry service in charge of the dosimetry for the worker. In Hungary and Switzerland, this is done by the outside undertaking only and in Denmark by the competent authority in charge of the system (National Institute of Radiation Protection (SIS)).

Table 6. Responsible to fill in the data regarding the operator

	outside undertaking	operator	other
Austria		yes	
Belgium*			FANC
Czech Republic		Yes	
Denmark			National Institute of Radiation Protection (SIS)

Finland		yes (called 'employer outside Finland')	Approved dosimetric services outside Finland
Fance		Yes (via operational dosimetry if performed)	
Greece		Yes	
Germany	yes	Yes	Determined by contracts between operator and outside undertaking
Hungary	yes		
Lithuania		Yes	
Netherlands	yes	Yes	
Poland		Yes	
Portugal			
Slovakia		Yes	
Slovenia			approved dosimetry service
Spain		Yes	
Sweden		Yes	
Switzerland	yes		
United Kingdom		Yes	

5.4. Health surveillance

5.4.1. Content

A section for the health surveillance is provided for almost all the countries (21 over 22, the exception in Sweden) who implemented a system for the radiological surveillance of outside workers (see table 7 for details about the content).

The *dates of the medical examinations* must be reported for all the countries that provide this section.

Most countries with a section for the health surveillance also indicate the *status of medical fitness* (18 over 21):

- For 11 countries, medical fitness in general and medical fitness in specific conditions are both indicated such as for Austria, Denmark, Lithuania, Belgium*, Estonia, Finland, Germany, Greece, Spain, Portugal, UK (expressed in another way: restrictions on types of work the person can do).

- Exclusively the general medical fitness is indicated for the 5 following countries: Hungary, Ireland, Netherlands, Slovakia, Slovenia.
- Exclusively the medical fitness for specific work condition is given for the 3 following countries: Czech Republic, Latvia, Poland.
- In France and in Switzerland, no information about the medical fitness is provided in the document.

Sometimes *other information* is provided in this section: the next date of medical examination, signature/name of the approved medical doctor executing the examination, modality of the medical examination, specific restrictions for the work in controlled area, ...

Table 7. Data regarding the health surveillance

	Dates of medical examinations	Medical fitness	Medical fitness specific work conditions	Other information
Austria	yes	yes	yes	next date medical examination, signature physician
Belgium*	yes	yes	yes	modalities of the medical examination (blood analysis, urine analysis,...)
Czech Republic	yes		yes	
Denmark	yes	yes	yes	Decision from Danish working environmental service
Estonia	yes	yes	yes	person conducting the health control
Finland	yes	yes	yes	occupational health station (+ adress, tel), occupational practitioner (+ its RP approval number), personal details (since independent document), reason for examination (pre-employment, periodic, ...), signature,...
France	yes	no	no	
Germany	yes	yes	Yes	Date of the following medical examination Separate section for respiratory protection (medical follow up as well as basic training concerning this topic)
Greece	yes	yes	yes	

Hungary	yes	yes		
Ireland	yes	yes		
Latvia	yes		yes	
Lithuania	yes	yes	yes	
Netherlands	yes	yes		
Poland	yes		yes	
Portugal	yes	yes	yes	
Slovakia	yes	yes		
Slovenia	yes	yes		
Spain	yes	yes	yes (Specific restrictions for working in controlled areas)	
Switzerland	yes			is the person able to perform a work with protective mask and protective clothing
United Kingdom	yes - actually date of annual medical review that may not include an actual medical examination	yes	no - The opposite, restrictions on types of work the person can do.	Name, signature and date of entry into Passbook of person acting for the employer in putting the entries into the Passbook.

5.4.2 Who fills in the data regarding health surveillance?

(See table 8 to visualize the answers)

For 9 countries, this part is filled by occupational health service: Austria, Estonia, Germany, Greece, Latvia, Portugal, Slovakia, Slovenia, Spain. For 3 of those countries (Austria, Estonia, Slovakia), the recognized occupational physician also fills this. For Estonia, the outside undertaking can also fill in the section.

For 5 countries (Belgium, Finland, France, Hungary, Poland) this is exclusively the role of the recognized occupational physician.

For 4 countries (Czech Republic, Netherlands, Switzerland, UK) this is exclusively the role of the outside undertaking.

For 2 countries (Denmark en Lithuania), the competent authority is charged to fill in the section.

Table 8. Who fills in the data regarding health surveillance?

	Occupational health service	Outside undertaking	Recognized occupational physician	Other
Austria	yes		yes	

Belgium*			yes	
Czech Republic		yes		
Denmark				National Institute of Radiation Protection (SIS)
Estonia	yes	yes	yes	
Finland			yes	
France			yes	
Germany	yes			
Greece	yes			
Hungary			yes	
Ireland	?	?	?	?
Latvia	yes			
Lithuania				Radiation Protection Centre
Netherlands		yes		
Poland			yes	
Portugal	yes			
Slovakia	yes		yes	
Slovenia	yes			
Spain	yes			
Switzerland		yes		
United Kingdom		yes via a person acting for the employer		

5.4.3 Who needs to consult the data regarding the health surveillance

(See table 9 to visualize the answers)

For 12 countries this section is used from both parts (operator and outside undertaking). Sometimes it has to be used in addition by the competent authority for example in Germany, Lithuania and Poland.

For Estonia, Netherlands, only the outside undertaking has to do it and for Hungary, only the competent authority.

Table 9. Who uses the data regarding the health surveillance

	Outside undertaking	Operator	Other
Austria	yes	yes	

Belgium*	yes	yes	
Czech Republic	yes	yes	
Denmark	?	?	?
Estonia	yes		
Finland	yes	yes	
France	yes	yes	
Germany	yes	yes	Competent authorities
Greece	yes	yes	
Hungary			Compenent authority (National Public Health and Medical Officer Service)
Ireland	?	?	?
Latvia		yes	
Lithuania	yes	yes	Radiation Protection Centre
Netherlands	yes		
Poland	yes	yes	labour and regulatory NAEA inspectors
Portugal			Competent authorities
Slovakia	yes	yes	
Slovenia		yes	
Spain	yes	yes	
Switzerland		yes	
United Kingdom	yes	yes	

5.5. Training data

5.5.1. Content

Half of the countries (11 countries out of 22) have a section for information about the training courses followed by the worker: Austria, Germany (in an additional document), Belgium*, Czech Republic, Estonia, Greece, Netherlands, Slovenia, Slovakia, Spain, Switzerland. For most of them information is given both for the basic training and specific training (not clear if information concerning the basic training is provided in Slovenia and Slovakia).

For these 10 countries, the date of training is given. The place of the training is given for 6 of them (Belgium*, Germany, Greece, Estonia, Spain, Switzerland).

Sometimes, other information is given: name and signature of the responsible of the training course, field dedicated to comments/remarks, ...

5.5.2. Who fills in the training data?

Most of the time the information regarding the basic training is filled by the outside undertaking and the one regarding the specific training by the operator (see table 10 to visualize the answers). However in Czech Republic, in Estonia and in the Netherlands, the outside undertaking fills the information for both type of training. In Austria information for both type of training are filled by both the outside undertaking and the operator.

Table 10. Who fills in the training data

	Basic training		Specific training	
	Outside undertaking	Operator	Outside undertaking	Operator
Austria	yes	yes	yes	yes
Belgium*	yes			yes
Czech Republic	yes		yes	
Estonia	yes		yes	
Germany	yes			yes
Greece	yes			
Netherlands	yes		yes	
Slovakia				yes - relevant instructor
Slovenia				yes - [Other - The institution that performed the training (approved organisation for basic training or operator for specific training)]
Spain	yes			yes
Switzerland	yes			yes

5.5.3. Who needs to consult the training data?

(See table 11 to visualize the answers)

Information about basic training is used by:

- both the outside undertaking and the operator in Austria, Belgium*, Greece, Slovakia (+ also by the competent authority for the 2 last countries);
- the outside undertaking in Spain;
- the operator in Czech Republic, Slovenia, Switzerland;
- the competent authority in Estonia and Germany.

Information about specific training is used by:

- both the outside undertaking and the operator in Austria, Greece, Spain, Slovakia (+ by competent authority for the 2 last countries);
- the operator in Belgium*, Czech Republic, Switzerland (+ by competent authority);
- the competent authority in Estonia en Germany

Table 11. Who uses the training data

	Basic training			Specific training		
	Outside undertaking	Operator	Other	Outside undertaking	Operator	Other
Austria	yes	yes		yes	yes	
Belgium*	yes	yes			yes	
Czech Republic		yes			yes	
Estonia			ERPC			ERPC
Germany			Competent authorities			Competent authorities
Greece	yes	yes		yes	yes	
Netherlands	yes			yes		
Slovakia	yes	yes	regulator	yes	yes	regulator
Slovenia		yes				
Spain	yes			yes	yes	CSN
Switzerland		yes			yes	the regulatory authority

5.6. Official dosimetry data

By official dosimetry data, we mean the dose data officially attributed to the worker and resulting from the periodical individual monitoring to which all radiation workers are officially submitted. The period of the monitoring is most of the time fixed at the national scale (although specific periods can be defined for particular professional activities).

All the countries who implemented (in progress for Belgium) a system for the radiological monitoring of outside workers do provide official dosimetry information.

It is to be noted that Germany dedicates a section of the passbook for reporting doses from exposure to natural sources (including radon).

5.6.1. Content

Cumulated dose for the current year, five year doses and life dose

Almost all the countries (except Slovenia) enter the cumulated effective dose *for the current year*.

More than half of them are also reporting the cumulated effective doses *for previous years* (in general for the 4 or 5 previous years): Austria, Belgium*, Czech Republic, Estonia, Finland, France, Netherlands, Portugal, Slovakia, Spain, Switzerland and the UK(would only be used if an Outside Worker was allocated a 5 year dose limit).

About one third of the countries are reporting the *lifetime dose* (Belgium*, Denmark, Estonia, France, Germany, Latvia, Netherlands, Spain, Sweden).

Periodical monitoring data

Denmark and Sweden are the only countries that do not report any periodical monitoring data for external doses.

For the 20 other countries reporting external doses:

- All of them report the *external whole body doses*. Sometimes the *external whole body doses for neutron* are reported separately (for 9 countries).
- Almost all of them (except Slovenia and Latvia) report *the external skin dose*.
- Only 4 countries do not report *doses at extremities* (Czech Republic, Ireland, Lithuania and Slovenia). The countries reporting doses at extremities do it at least for hands, most of the time for several extremities.
- The *monitoring period* is most of the time of one month but sometimes arrange is used for other periods like a week, a quarter and up to one year. Ireland and Lithuania do not specify any monitoring period. Finland gives the freedom to choose the period. Since in Finland, the system only concerns outside workers going abroad and since the operator is responsible for the official dosimetry (remark: no distinction between operational and official dosimetry for Finland), the period chosen is the one in use for official dosimetry in the country of the mission.

Only 4 countries (Denmark, Estonia, Germany, Greece) do not report monitoring data for *internal dosimetry*.

Other type of data

Sometimes it is also used to report *emergency exposure data* or doses *exceeding the official dose limits*.

5.6.2. Who fills in the official dosimetry data

In the different countries, the official dosimetry data is reported by 4 main actors: the outside undertaking, the approved dosimetry service, the operator and the

competent authority. A combination of different actors is often required to fill in this part (See table 12 to visualize the answers).

Table 12. Who fills in the official dosimetry data

	Outside undertaking	Approved dosimetry service	Operator	Other
Austria	yes	yes	yes	
Belgium			yes (delegated to the health physics service): data after issuance	FANC : data before issuance
Czech Republic	yes		yes: abroad, in some countries only	
Denmark				National board of Health: competent authority: data before issuance
Estonia		yes		
Finland		yes : data after issuance		STUK: before issuance
France		yes		
Germany	yes			
Greece		yes		
Hungary	yes		yes	
Ireland				yes - Unspecified
Latvia				work supervisor
Lithuania				Radiation Protection Centre
Netherlands	yes	yes		
Poland	yes			Radiation Safety Inspector of Operator
Portugal		yes		
Slovakia	yes	yes		National register
Slovenia		yes		
Spain	yes		yes- Internal doses can be filled by the operator if it has its own approved dosimetry service	
Sweden				SSI: data before issuance
Switzerland	yes			

United Kingdom	yes Category workers employer	- A		
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5.6.3. Who needs to consult the official dosimetry data?

For 11 countries (Austria, Belgium*, Czech Republic, Greece, Lithuania, Netherlands, Poland, Slovakia, Spain, Switzerland and UK) the section is used by both the outside undertaking and the operator. For 4 of these countries (Poland, Lithuania, Slovakia en Switzerland) this is in addition used by the authorities. In Spain and in Belgium*, this section is also used by the Occupational Health Service in charge of the health surveillance of outside workers.

In Sweden and in Denmark (single use: one document per work performed for one operator), where the official dosimetry data only consists in historical dose data before the intervention (extracted from the national dose registry stating the annual effective dose, the life time effective dose, ...) for the attention of the operator, it is only used by the operator. In Sweden, informing the operator about the dose history of the worker is the only aim of the document which does not contain any operational dosimetry (see later in the text).

For 3 countries (Germany, Slovenia, Finland), the use is by the operator and by the competent authorities. In Finland the document can be used for several interventions (to different operators) abroad but has to be returned to STUK once the worker is back to work in Finland, so the use by the authority occurs frequently.

For Latvia, it is used by the operator and by the approved dosimetry service.

In Estonia, the section is only used by the outside undertaking.

In France, the occupational physician has access to all the doses of the workers he is in charge of. The radiation protection officer (in French "*personne compétente en radioprotection*") designed by the employer has access to effective doses (over the last 12 consecutive months) and to operational doses) for the workers he is in charge of. The operator and outside undertaking, as well as occupational physicians and radiation protection officers interact in relation to dosimetry data.

No answer was provided by Ireland concerning this issue.

5.7. Operational dosimetry data

Operational dosimetry data means the external and internal doses (where required) estimated during the period of activity carried out by the outside worker in the operator's controlled areas. The period is limited by the period of the work.

Amongst the 22 countries making use of a radiological surveillance system for the outside workers, 6 do not provide operational dosimetry data: Estonia, Finland, Hungary, Latvia, Switzerland and Sweden. We know however that for Switzerland and Finland, the begin/end dates of an activity carried to an operator are reported in

the document. Furthermore, in Switzerland, the official doses per monitoring period are attributed by the operator (which means that for a given monitoring period, there can be several official doses registered for different operators for the individual outside worker).

5.7.1. Content

For the countries reporting operational dosimetry:

Most of the time, the *beginning/end dates of an activity* are recorded (not in Denmark, Lithuania and Czech Republic) and sometimes, *information concerning the type of work* carried out in the controlled area is also reported.

All these countries report the external *whole body dose* and 8 amongst them report the *neutron doses* separately. All except France, Greece and Spain report the external *skin dose*.

Most of them also report *operational doses at the extremities* (8 out of 16) for the hands and also often for other extremities.

All of them except France, Greece, Spain and Ireland report *internal doses* within this section. Spain has created a separate section in the passport for internal dosimetry, independent on the sections for official dosimetry and operational dosimetry. France has created also a separate section in the national database for the results of internal exposure monitoring.

5.7.2. Who fills in the operational dosimetry data ?

This data is mainly filled by the operator (See table 13 to visualize the details of the answers)

5.7.3. Who needs to consult this section ?

This section is mainly used both by the operator and the outside undertaking. This is the case for the 9 following countries: Austria, Belgium* (+ also by approved physician), Czech Republic, France, Lithuania, Netherland, Poland (+ by the competent authority) and Slovakia and UK.

This section is only used by the operator in 2 countries: Slovenia (+ by the competent authority) and Spain. In Greece, it is only used by the outside undertaking.

In Germany, this is only done by the competent authority.

(See table 12 to visualize the answers)

Table 13. Who fills and uses the operational dosimetry data

	Who fills this information?			Who uses this information?		
	Operator	Approved dosimetry service	Other	Outside undertaking	Operator	Other
Austria	yes	yes		yes	yes	
Belgium*	yes			yes	yes	yes : occupational physician
Czech Republic	yes			yes	yes	
Denmark	yes	yes				
France	yes			yes	yes	
Germany	yes					Competent authorities
Greece	yes			yes		
Ireland			The Radiation Protection Officer			The Radiation Protection Officer
Lithuania	yes			yes	yes	yes
Netherlands	yes	yes		yes	yes	
Poland	yes			yes	yes	NAEA, sanitary and labour inspectors
Portugal		yes				DGS internal methodology, not known to CIPRSN
Slovakia	yes			yes	yes	
Slovenia	yes - In practice the operational dosimetry is the responsibility of the operator				yes	Operational dosimetry is controlled by regulatory authority as a part of ALARA programme.
Spain	yes				yes	
United Kingdom	yes			yes	yes	

5.7.4. Who ensures that the section is kept up to date ?

Only the outside undertaking in the 5 following countries: Austria, Czech Republic, Germany, Greece and Poland.

Only the operator in the 2 following countries: Denmark, Slovenia.

In the 7 following countries, both parties collaborate to this task: Belgium*, France, Lithuania, Netherlands, Slovakia, Spain, UK.

5.7.5. Consistency with the official data

Thirteen of the 16 countries with a section for the operational dosimetry stipulate that the checking of the consistency between the operational data and the official data is executed.

This task is done by the outside undertaking in Czech Republic, UK, France (via radiation protection officer), Germany, Greece and Belgium* and by the operator in Lithuania and Slovenia. In Germany and Slovenia it is also done by the competent authority.

In Spain, Dosimetry Services in Spanish NPPs are required (by the CSN), to analyze and justify any discrepancies of more than 20 % prior to entering the official doses into the radiation passbook.

In Denmark, it is done by the approved dosimetry service and by the competent authority.

In France, the SISERI system underlines the cases where a significant difference exists between the operational dosimetry and the passive one.

Finally in Poland, Austria and in Estonia it is exclusively done by the competent authority.

5.7.6. Recording of the operational dosimetry in a centralized data base ?

Only Austria, Denmark, France, Germany, Poland and Belgium* record operational dosimetry.

6. Approval of the dosimetry services within the participating countries.

	approved internal dosimetry services	approved external dosimetry services	approved record keeping dosimetry services	approved dosimetry services	accreditation required for approval ?	Approving Regulatory Authority
Austria	1	4	5	5	yes	Federal Ministry of Economy and Labour, Division for Accreditation
Belgium	a few (not yet approved)	11 (approval obligatory before August 2010)	0	11 (not yet approved)	yes	Federal Agency for Nuclear Control
Czech Republic	3	5	0	7	no	State Office for Nuclear Safety
Denmark	2	3	1	3	no	National Institute of Radiation Protection (SIS)
Estonia	0	1	1	1	yes	Estonian Accreditation Centre

Finland	1	3	4	3	yes (accreditation or similar level quality system)	STUK
France	10	9	1	19	yes	Autorité de sûreté nucléaire (ASN)
Germany	25	4	0	29	yes	The competent authorities of the German Länder
Greece	1	1	1	1	no	Greek Atomic Energy Commission
Hungary	1	3	1	3	yes	Ministry of Health
Ireland	1 - The Radiological Protection Institute of Ireland	2 - The Health Protection Agency (UK) and Landauer (UK)	1 - The Radiological Protection Institute of Ireland	3	yes	INAB are the accreditation body responsible for accrediting dosimetry services for the purposes of the regulations
Latvia	1	1	1		no	Radiation Safety Centre
Lithuania	1	2	2	2	no	Radiation Protection centre
Norway	1	2	2	2	no	The radiation protection authority (NRPA).
Netherlands	4	4	4	4	yes	Ministry of Social Affairs.
Poland	1	4	0	5	yes	With formal quality management accreditation given by Polish Accreditation Centre PCA approves President of NAEA
Portugal	1	5	0	0	yes	General Directorate for Health (DGS)
Slovakia	2	3	1	3	no	Public Health Authority of the Slovak republic
Slovenia	2	3	CRPD is kept by regulatory authority (SRPA).	3	yes	SRPA
Spain	9	21	Approved dosimetry services (external and internal) in Spain are not only responsible for dose assessment and reporting, but also for dose record-keeping	30	no	CSN (Nuclear Safety Council)
Sweden	6	11	2	11	no	Swedish Radiation Protection Authority (SSI)

Switzerland	6	11		13	no	Federal Office of Public Health, Nuclear Inspectorate Swiss Federal Safety
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III. Good practices used in developing a national radiation passbook and in its practical use

Good practices are identified for creating a radiation passbook and its subsequent practical use by the outside undertaking and the operator.

These “good practices” are derived from the answers to the questionnaire, the examples of existing radiation passbooks, single use documents and experience from countries using an electronic system.

1. Application of the Directive

The Directive applies to outside workers of category A (category B is optional), inside and outside their country and includes employees, self-employed workers, students, apprentices and trainees.

2. Selected definitions

The following definitions should be taken from or in accordance with the definitions in the EC Directive

1. Outside worker, which should include mention of
 - self-employed workers
 - students, apprentices, trainees
2. Outside undertaking
3. Operator

3. Rights and responsibilities

The radiation passbook (or single issue document) or electronic system must enable the operator 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 operator’s controlled areas.
- enter in the passbook an estimate of the radiation dose received by the outside worker in the operator’s controlled area

The outside undertaking should have made arrangements for

- official dosimetry (the dosimeters may be actually provided by the operator by arrangement)
- medical surveillance (possibly using the medical surveillance system of the operator by arrangement)

- basic training (the basic training may actually be provided by the operator by arrangement)
- any specific training needed by his employees for the work activities to be carried out in the operator's controlled areas. This training would normally be provided by the operator.
- authorization/notification of their activities as required by national regulations.

4. Practical use of the passbook

- The content and the issuing procedure should follow the requirements of the regulator/issuing authority.
- The outside undertaking 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 they have more than one employer. Consequently the passbook should have the facility to enter more than one outside undertaking.
- Language : either national language(s) + English or national language(s) with code
- Validity period : the document must mention its validity period
- Reusability : the document should mention whether it is single use or multi-use
- The outside undertaking keeps a register of who has been authorised, on behalf of the outside undertaking, 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 operator keeps a register of who has been authorised, on behalf of the operator, to write information into specified parts of the radiation passbook e.g.
 - estimated doses for activities in the operator's controlled areas

IV. Data to include in the radiation passbook

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

Below is a copy of annex I and annex II to Council Directive 90/641 Euratom

ANNEX I

PROVISIONS COMMON TO THE NETWORKS AND INDIVIDUAL DOCUMENTS REFERRED TO IN ARTICLE 4 (2)

PART I

1. Any radiological monitoring system of the Member States for outside workers must comprise the following three sections:

- particulars concerning the outside workers' identity;*
- particulars to be supplied before the start of any activity;*
- particulars to be supplied after the end of any activity.*

2. The competent authorities of the Member States shall take the measures necessary to prevent any forgery or misuse of, or illegal tampering with, the radiological monitoring system.

3. Data on the outside worker's identity must also include the worker's sex and date of birth.

PART II Before the start of any activity, the data to be supplied via the radiological monitoring system to the operator or his approved medical practitioner by the outside undertaking or an authority empowered to that end must be as follows:

- the name and address of the outside undertaking;*
- the medical classification of the outside worker in accordance with Article 35 of Directive 80/836/Euratom;*
- the date of the last periodic health review;*
- the results of the outside worker's individual exposure monitoring.*

PART III The data which the operator must record or have recorded by the authority empowered to that end in the radiological monitoring system after the end of any activity must be as follows:

- the period covered by the activity;*
- an estimate of any effective dose received by the outside worker;*
- in the event of non-uniform exposure, an estimate of the dose-equivalent in the different parts of the body;*
- in the event of internal contamination, an estimate of the activity taken in or the committed dose.*

ANNEX II

PROVISIONS ADDITIONAL TO THOSE OF ANNEX I CONCERNING THE INDIVIDUAL RADIOLOGICAL MONITORING DOCUMENT

1. The individual radiological monitoring document issued by the Member States' competent authorities for outside workers shall be a non-transferable document.

2. Pursuant to Annex I, Part I (2), individual documents shall be issued by the Member States' competent authorities, which shall give each individual document an identification number.

In order to fulfil these requirements, the following data fields are suggested by the WG1. Mandatory fields are given in black, optional fields in grey:

Details of the radiation worker

Surname

2nd Surname

First name

Middle names

Sex

Date of birth

Nationality

Picture

Signature

Unique identification number

(unique number in the worker's employer's country, for example :

National number

Social security number

Fiscal number)

Relevant dose limits

Whole-body dose (Effective dose)

Eyes (Equivalent dose)

Skin/Extremities (Equivalent dose)

Other

Issuing details of the radiation passbook

Radiation passbook number

Issuing date

Expiry date

Issuing body

Address

Tel number

Fax number

E-mail

Mark of endorsement

General information

(any information needed by foreign operator to interpret the conditions applying to this worker, depending on the nationality of his employer – although optional, it is strongly recommended to add a minimum of information)

Contents

Guidelines to fill in the radiation passbook

General information – including :

- purpose of the passbook
- conditions of use
- scope of application
- temporality

- conditions of issue/renewal
- loss of the radiation passbook/damage to the radiation passbook
- pursuit in case of fraudulent use/entries/amendments
- summary of the legal provisions relative to the operational protection of outside workers, including the definition of the following concepts :
 - operator
 - outside undertaking
 - outside worker
 - official dosimetry
 - operational dosimetry
 - national dose limits (explanation)

Current outside undertaking

(outside undertaking = outside worker's employer)

Outside undertaking

Name

Identification number *(unique number in the outside undertaking's country)*

Outside undertaking number

Address

Tel

Fax

e-mail address

Employment

Start date

End date

Occupational category (for ex: NACE code)

Classification (A or B)

Stamp and signature or identification number of the responsible party

Health surveillance

Date

Type of examination

Result *(fit, not fit, fit subject to special conditions as shown)*

Restrictions to work with radiations

Validation of result *(approved medical practitioner, approved occupational health service or other authorised person)*

Name

stamp and signature or identification number

Period of validity of the result

Official dose record up to the radiation passbook issue date

Occupational life time dose (mSv)

(best estimate of the occupational life time dose based on the available dose records)

External dose

Effective dose [Personal dose equivalent $H_p(10)$] for photons and electrons {1}

Neutron dose {2}

Skin dose [Personal dose equivalent $H_p(0.07)$]

Equivalent dose to specific body location (extremities/other area's)

Equivalent dose to the lens of the eye [$H_p(3)$]

Internal dose

Committed effective dose from internally deposited radionuclides [$E(50)$] {3}

Committed equivalent dose [$H_T(50)$] to specific individual organs or tissues

Effective dose [sum of {1}, {2} and {3}]

Authorized signature/stamp of the issuing entity and date

(not necessarily a physical signature)

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

Year *(calendar years)*

Effective dose [sum of {1}, {2} and {3}]

External dose

Effective dose [Personal dose equivalent $H_p(10)$] for photons and electrons {1}

Neutron dose {2}

Skin dose [Personal dose equivalent $H_p(0.07)$]

Equivalent dose to specific body location (extremities/other area's)

Equivalent dose to the lens of the eye [$H_p(3)$]

Internal dose

Committed effective dose from internally deposited radionuclides [$E(50)$] {3}

Committed equivalent dose [$H_T(50)$] to specific individual organs or tissues

Observations

Authorized signature/stamp of the issuing entity and date

Details concerning the entities responsible for the record of the official dosimetry

(Approved dosimetry service or National Dose Register)

(only if different with section 2, entity issuing the passbook)

Responsible entity

Name

Address

Contact person

Name

Tel number

Fax number

E-mail

Official dose record for the current year (mSv)

(the document should indicate clearly if these are the doses per monitoring period or cumulative)

Period (ddmmyyyy-ddmmyyyy)

Effective dose [sum of {1}, {2} and {3}]

External dose

Effective dose [Personal dose equivalent $H_p(10)$] for photons and electrons {1}

Neutron dose {2}

Skin dose [Personal dose equivalent $H_p(0.07)$]

Equivalent dose to specific body location (extremities/other area's)

Equivalent dose to the lens of the eye [$H_p(3)$]

Personal dose equivalent $H_p(10)$ under apron

Personal dose equivalent $H_p(10)$ above apron

Internal dose

Committed effective dose from internally deposited radionuclides [$E(50)$] {3}

Committed equivalent dose [$H_T(50)$] to specific individual organs or tissues

TOTAL (*sum of the periodical contributions to the effective dose for one year*)

Signature of the responsible person and identification number of the outside undertaking

Operational dose in the operator's controlled area(s) (mSv)

(an estimate of any dose received by the outside worker, to be filled by the operator after the end of any activity in the operator's controlled area if the official dose is not (yet) available)

Name and address operator

Period covering the activity

Start date

end date

Effective dose [sum of {1}, {2} and {3}]

External dose

Effective dose [Personal dose equivalent $H_p(10)$] for photons and electrons {1}

Neutron dose {2}

Skin dose [Personal dose equivalent $H_p(0.07)$]

Equivalent dose to specific body location (extremities/other area's)

Equivalent dose to the lens of the eye [$H_p(3)$]

Personal dose equivalent $H_p(10)$ under apron

Personal dose equivalent $H_p(10)$ above apron

Internal dose

Committed effective dose from internally deposited radionuclides [$E(50)$] {3}

Committed equivalent dose [$H_T(50)$] to specific individual organs or tissues

Signature/stamp of the responsible person for the operator and date

Information regarding training in radiological protection

Basic Training in radiological protection

Date

Description of the contents

Centre or training company

Signature and stamp of the responsible for the entity or delegated person

Observations

Specific training in radiological protection

Date

Description of the contents

Centre or training company

Signature and stamp of the responsible for the entity or delegated person

Observations

V. Radiological passbook Model

A model of radiological passbook with minimum requirements (in black) and optional requirements (in gray) on the data contents has been drafted.

This model should be considered as a tool to visualize the required data as given in section IV. 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 section III and it contains the minimal data content (black fields).

Annex I. Questionnaire

Annex II. List of the references of the national laws transposing the directive in the countries participating to the survey

Member state	National Legal Provisions
Austria	Radiation Protection Act [BGBl. I No. 137/2004: Strahlenschutz-EU-Anpassungsgesetz], General Radiation Protection Ordinance [BGBl. II No. 191/2006: Allgemeine Strahlenschutzverordnung]
Belgium	Royal Decree of 25 April 1997 (on the protection of workers against the hazards of ionizing radiations) http://www.werk.belgie.be/moduleTab.aspx?id=612&idM=102 Royal Decree of 20 July 2001 (general regulation on the protection of the population, of the workers and the environment against the hazards of ionizing radiations) http://www.fanc.fgov.be/nl/page/koninklijk-besluit-20-07-2001-samenvatting/30.aspx
Czech Republic	Act. No. 18/1997 Coll. ("Atomic Act") amended by Act. No. 13/2002 Coll. Decree No. 419/2002 Coll., on Personal Radiation Passports, Decree No. 317/2002 Coll., on Radiation Protection (amended by Decree No. 499/2005 Coll.)
Denmark	Departmental order nr. 663, 1994.07.12 with addition from departmental order nr. 826, 1997.10.31
Estonia	Requirements for the Results of Individual Monitoring of Outside Workers, and for Formalising such Results, and for the Standard Format for the Dose Chart of Outside Workers, Regulation of the Minister of the Environment No. 110 of 27 August 2004, RTL ² , 0 9.09.04, 117, 1821, entered into force 12.09.04.
Finland	- Radiation Act (592/1991), Radiation Decree (1512/199, Nuclear Energy Act (990/1987), Nuclear Energy Decree (161/1988) with their amendments; Decision of the Council of State on the general regulations for the safety of nuclear power plants regulatory (395/1991); Guides on radiation Safety ST 1.6 (Operational Radiation Protection) and Guide ST 7.4 (Registration of Radiation Doses) and Guides ST 7.5 (Medical surveillance of occupationally exposed workers); Regulatory Guides on Nuclear Safety YVL 7.9 (Radiation protection of workers at nuclear facilities) and YVL 7.10 (Monitoring of occupational exposure at nuclear facilities) (http://www.edilex.fi/stuklex/en/)
France	- Code du travail, article R.4451-1 to R.4457-14, annex of decree n° 2003-296
Germany	Outside workers and outside undertakings of outside workers need a prior authorization (Article 15 RPO) or prior notification (Article 95 RPO, Article 6 German X-Ray Ordinance). Due to this authorization or notification the licensee has all obligations for the radiation surveillance of the workers based on the requirements of the European directive 96/29/EURATOM which is implemented in the German RPO (RPO = German Radiation Protection Ordinance)
Greece	
Hungary	Decree No, 30/2001 (X.3.) of Minister of Health
Ireland	Radiological Protection Act, 1991 (Ionising Radiation) Order 2000 (Statutory Instrument No. 125 of 2000).
Latvia	Regulation No.454 Procedures for Control and Recording of Exposure to Radiation of Workers
Lithuania	Hygiene Standard HN 83:2004 "Radiation protection and safety of outside workers", Hygiene Standard HN 73: 2001 "Basic Standard of Radiation Protection"
Netherlands	
Norway	The directive is not considered implemented in Norwegian radiation protection regulations as the general radiation protection regulations also covers outside companies working in Norway
Poland	1. Act of Parliament of 29 November 2000 Atomic Law, Official Journal 42 of 2007 item 276

	2.Regulation of the Council of Ministers of 27 April 2004 on the protection against ionising radiation of outside workers exposed during their activities in controlled areas, Official Journal 102 of 2004 item 1064.
Portugal	Regulative Decree 29/97 of 29 July of 1997 and its amending Decree 14-M/97; Order no. 8934/97. Approving Regulatory Authority of Dosimetry Services – Decree Law no.167/2002 of 18 July 2002.
Slovakia	Governmental decree 346/2006 Col. on protection of outside workers working in controlled area
Slovenia	- Ionising Radiation Protection and Nuclear Safety Act (OJ RS, No.102/04 - reviewed) - Rules on the obligations of the person carrying out a radiation practice and person possessing an ionising radiation source (OJ RS, No. 13/2004) - Rules on the method o of keeping records of personal doses due to exposure to ionizing radiation (OJ RS, No. 33/2004)
Spain	- Royal Decree 413/1997 of 21 May 1997 on the operational protection of outside workers exposed to ionising radiation during their activities in controlled areas. - Nuclear Safety Council Resolution of 16 July 1997 on the creation of the National Registry of Outside Undertakings. - Nuclear Safety Instruction IS-01 of 31 May 2001 on the definition of the format and content of the Radiological Passport. - Nuclear Safety Council Instruction IS-06 of 9 April 2003 on the definition of the basic and specific radiation protection training programmes in radiation protection for outside workers in nuclear power plants and nuclear fuel cycle facilities The Nuclear Safety Council is the Spanish Regulatory Body in nuclear safety and radiation protection.
Sweden	The Swedish Radiation Protection Institute's Regulations on Outside Workers at Work with Ionising Radiation, SSI FS 1996:3
Switzerland	Federal Ordinance on Radiological Protection (1994)
United Kingdom	In Great Britain "The Ionising Radiations Regulations 1999"(IRR99) implement the Directive 90/641/Euratom. In Northern Ireland "Ionising Radiations Regulations (Northern Ireland) 2000" implement the Directive 90/641/Euratom.