ESOREX-Platform: European Platform for Occupational Radiation Exposures

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Contents

- Introduction: context and motivation
- Main objectives of the ESOREX-Platform
- Methodology and timetable of the project
- General structure of the Platform
- Functions and end-users
- Conclusion
ESOREX (European Study on Occupational Radiation Exposure)
Project initiated by the European Commission in 1997

- Overview on national arrangements for radiation worker’s monitoring, dose reporting and recording
- European database on occupational exposure
- First attempt to harmonise data collection
  - Common data reporting format
  - Categorisation of professional work activities

➡️ A recommendation to develop a sustainable Platform emerged during the last ESOREX Symposium in Prague, May 2010
Main objectives of the ESOREX-Platform project

3-years European project (Dec. 2012 - Dec. 2015) funded by the EC
Contractor = IRSN, France

- To develop a Platform which allow representatives from national dose registries and dosimetry services to discuss emerging issues, assess dose trends and exchange experience

- To establish working relationships with other relevant international organisations and bodies (in particular with UNSCEAR, HERCA, IAEA, NEA, EURADOS)

- To develop appropriate mechanisms and establish the appropriate infrastructure to enable the sustainable continuation of operation of the ESOREX platform beyond the 3-years project, without further European Commission financial support
Methodology and Timetable of the project

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st workshop, Paris</td>
<td>Oct. 2014</td>
</tr>
<tr>
<td>2nd workshop, Paris June or July 2015</td>
<td></td>
</tr>
<tr>
<td>Definition of the structure of the Platform and of the corresponding required data.</td>
<td></td>
</tr>
<tr>
<td>Development of a prototype.</td>
<td></td>
</tr>
<tr>
<td>First collection of data and test of the prototype.</td>
<td></td>
</tr>
<tr>
<td>Development of the final ESOREX Platform and collection of the global data.</td>
<td></td>
</tr>
</tbody>
</table>
General structure of ESOREX-Platform

- A dedicated website including 2 main tools:
  - A “Database” dealing with:
    - national arrangements for occupational radiation exposure monitoring (national regulation, practises in worker’s monitoring, dosimetric methods used...);
    - results and trends of occupational exposure by domain/sectors of activity, for some occupations, in EU member states and associated states.
  - A “Collaborative tool” allowing some exchanges between national experts in occupational RP
9 relevant ‘regulatory topics’ have been retained

- Identification of the national competent authority
- Description of the national legislative framework
  - Main texts of the national regulation
  - Provisions more stringent than the Directive EURATOM
- Organization of the national dose register
  - National body responsible for national statistics
  - Type of recorded data
  - Access to the register data
  - ...
- Description of the implementation of radiation passbook
- Approved dosimetry services
- Description of the techniques or procedures used for individual monitoring
  - external exposure
  - internal exposure (including committed dose calculation)
  - aircrew exposure
Database : national arrangements (2)

Information concerning national arrangements are

- accessible on website by topic for each country (also friendly printable)

<table>
<thead>
<tr>
<th>Participating countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
</tr>
</tbody>
</table>

ESOREX news
- May 2014 (2)
- March 2014 (1)
- February 2014 (1)
- January 2014 (1)
- December 2013 (1)
- November 2013 (8)

- National dose register

<table>
<thead>
<tr>
<th>Participating countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
</tr>
</tbody>
</table>

- National dose register

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**National competent authorities**

The national competent authority is ASN (French Safety authority).
ASN is working with the technical support of IRSN (Institute for Radiological Protection and Nuclear safety).

**Main texts of the national regulation:**

The present national regulation is based on the Labour code (articles R.4451-1 to R.4451-144).

Several orders applying the Labour code specify the rules concerning: the dosimetric monitoring of workers (arrêté du 17 juillet 2013), the approval of dosimetry services (arrêté du 21 juin 2013), the exposure to the NORM (arrêté du 25 mai 2005), the exposure to radon (arrêté du 7 août 2008), and aircrew exposure (arrêté du 8 décembre 2003).

**Provisions more stringent than the Directive EURATOM:** Yes

The effective dose limit is of 20 mSv each year rather than 20 mSv/year on average over 5 years.
Database: results and trends of exposure

List of the main parameters considered into the database

- **Country**
  - *all countries participating in the platform, not limited*

- **Year of exposure**
  - *annual data (> 2010)*

- **Type of exposure and related dosimetric quantities**
  - *whole body (external (γ+β), external (neutron), internal committed dose, and effective dose = sum of the 3)*
    - skin
    - extremities
    - lens of the eye

- **Field, sector or subsector of activity**

- **Occupation**
  - *More representative occupations of each sector/subsector*

- **Parameters of exposure**
  - *collective dose*
    - average dose per caput
    - number of workers
Data for activities and occupations

A unique list for activities and occupations of interest including fields, sectors, subsectors, occupations

7 main activity fields have been retained
- Medical field
- Industry (without nuclear industry)
- Nuclear field
- Transport
- Research and education
- Natural sources
- Other fields

In each field of activity, relevant sectors and subsectors have been listed and relevant occupations in these sectors/subsectors have been retained
- to limiting the complexity of the matrix
- to focusing on the main situations for which workers are generally more exposed
## Example for the medical field

<table>
<thead>
<tr>
<th>Field</th>
<th>Sector</th>
<th>Subsector</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical field</td>
<td>Diagnostic radiology</td>
<td></td>
<td>Physician (diag. radiology) Radiographer (diag. radiology)</td>
</tr>
<tr>
<td></td>
<td>Interventional radiology</td>
<td></td>
<td>Physician (cardio./interv. radiologist) Nurse (interv. radiology) Radiographer (interv. radiology)</td>
</tr>
<tr>
<td></td>
<td>Radiotherapy</td>
<td>Teletherapy only</td>
<td>Physician (nucl. med diag) Nurse (nucl. med diag) Radiographer (nucl. med diag)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teletherapy + brachytherapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nuclear medicine</td>
<td>Diagnostic unit only</td>
<td>Physician (nucl. med) Nurse (nucl. med) Radiographer (nucl. med)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Therapeutic/diagnostic unit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dental radiology</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Veterinary units</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other medical activities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Example for the nuclear field

<table>
<thead>
<tr>
<th>Field</th>
<th>Sector</th>
<th>Sub-sector</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear field</td>
<td>Military activities</td>
<td>Weapon manufacturing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Propulsion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uranium ore extraction/processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enrichment and conversion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fuel fabrication</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nuclear power reactors</td>
<td></td>
<td>See next slide</td>
</tr>
<tr>
<td></td>
<td>Reprocessing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dismantling</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waste management facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nuclear logistics and maintenance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Occupations in the nuclear power reactors

- Scaffolder
- Insulator
- Valve mechanic, plumber
- Welder
- Pipe fitter, boilmaker
- Diver
- Decontaminator
## Database : exposure parameters

### Collective dose

### Average dose per caput
- all monitored workers
- Measurably exposed workers (dose > recording level)

<table>
<thead>
<tr>
<th>EXPOSURE</th>
<th>COLLECTIVE DOSE (CD)</th>
<th>Dose per caput (monitored workers)</th>
<th>Dose per caput (measurably exposed workers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHOLE BODY</td>
<td>CD wb <em>man.Sv</em></td>
<td>CD wb / M wb <em>mSv</em></td>
<td>CDwb/ (Mwb - NE wb) <em>mSv</em></td>
</tr>
<tr>
<td>SKIN</td>
<td>CD s <em>Hp 0.07 skin</em> man.Sv</td>
<td>CD s / M s <em>mSv</em></td>
<td>CD s / (M s - NE s) <em>mSv</em></td>
</tr>
<tr>
<td>EXTREMITIES</td>
<td>CD ext <em>Hp 0.07 ext</em> man.Sv</td>
<td>CD ext / M ext <em>mSv</em></td>
<td>CD ext / (M ext - NE ext) <em>mSv</em></td>
</tr>
<tr>
<td>LENS OF THE EYE</td>
<td>CD le <em>Hples</em> man.Sv</td>
<td>CD le / M le <em>mSv</em></td>
<td>CD le / (M le - NE le) <em>mSv</em></td>
</tr>
</tbody>
</table>
# Database: exposure parameters

## Number of workers per dose bands

- Whole body exposure

<table>
<thead>
<tr>
<th>EXPOSURE</th>
<th>DOSE (D)</th>
<th>PARAMETERS OF EXPOSURE</th>
<th>NUMBER OF WORKERS</th>
<th>TOTAL PER DOSE BANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHOLE BODY</td>
<td>CD wb</td>
<td>CD wb/ M wb</td>
<td>CDwb/ (M wb - NE wb)</td>
<td>Mwb</td>
</tr>
<tr>
<td></td>
<td>man.Sv</td>
<td>mSv</td>
<td>mSv</td>
<td>mSv</td>
</tr>
</tbody>
</table>

- Lens of the eye exposure (same dose bands- the new limit of 20 mSv has been considered)
Database: exposure parameters

- Skin exposure
- Extremity exposure

<table>
<thead>
<tr>
<th>EXPOSURE</th>
<th>PARAMETERS OF EXPOSURE</th>
<th>DOSE (D)</th>
<th>NUMBER OF WORKERS</th>
<th>TOTAL PER DOSE BANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLLECTIVE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOSE (CD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dose per caput monitored workers</td>
<td>Dose per caput measurably exposed workers</td>
<td>TOTAL monitored</td>
</tr>
<tr>
<td>SKIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD s</td>
<td></td>
<td>CD s / M s</td>
<td>CD s / (M s - NE s)</td>
<td>Ms</td>
</tr>
<tr>
<td>Σ Hp 0.07 skin</td>
<td>mSv</td>
<td>mSv</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXTREMITIES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD ext</td>
<td></td>
<td>CD ext / M ext</td>
<td>CD ext / (M ext - NE ext)</td>
<td>Mext</td>
</tr>
<tr>
<td>Σ Hp 0.07 ext</td>
<td>mSv</td>
<td>mSv</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Collaborative tool of ESOREX-platform

A forum where experts can discuss and exchange information

Three “sub-forum” have already been created (these should be enriched over time with new topics) for discussions

- about technical or practical aspects of the platform
- about data of exposure, updating data... (information on display of new data for example)
- about transposition of the European BSS Directive
# Functions and End-users

<table>
<thead>
<tr>
<th></th>
<th>National administrator</th>
<th>ESOREX correspondents</th>
<th>Experts of countries or international organizations</th>
<th>Public</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration of national access rights</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Database</strong>: Description of the national arrangements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input of data</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Consultation (predefined pages)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Database</strong>: Data of occupational exposures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input of data</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Consultation level 1 (predefined pages/figures)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Consultation level 2 (database requests)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><strong>Collaborative tool</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Reading</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>
Query database (data of exposure/country/year/type of data/activity field or sector)

- National correspondants and experts

Input and update data (national regulation and data of exposure)

- National correspondants

Exchange between correspondants and experts

- National correspondants and experts
Monitored workers and collective dose per field

Country

Year

All countries

2013

Apply

Monitored workers per field

Collective dose per field (man.Sv)
Monitored and exposed workers per countries

Year
2012

Workers

France
Germany
Greece
Switzerland
Ireland
Slovenia

Monitored workers
Exposed workers
Average individual dose per countries and average values over all countries

Year
2012

Average dose (mSv)

France  Germany  Greece  Switzerland  Ireland  Slovenia

Avg dose / monitored workers (mSv)  Avg dose / exposed workers (mSv)  Avg value / exposed workers (over all countries)  Avg value / monitored workers (over all countries)
Conclusion

ESOREX-Platform:
A new tool dedicated to occupational exposures has been developed

- It is NOT ONLY a database
- BUT ALSO a forum for exchange of experience
- Web based competence center for national practices of ORP in Europe
- Network for central dose registers and regulatory bodies

Its sustainability will depend on the support of the national competent authorities in Europe and on the involvement of the end-users
Thank you for your attention!