Introduction

- Optimisation of radiation protection
  - ALARA
    - As Low As reasonably Achievable
- The European ALARA Network
  - Evolution
  - Operation
  - Key activities
  - Achievements
  - New challenges
  - Networking with national radiation associations
Optimisation of radiation protection

- Justification, optimisation and limitation
- ICRP 103 (2007) Revised recommendations
  - ALARA broader than the approach of ICRP 60
  - includes also the development of a safety culture and stakeholder participation in the decision process
  - a source-related process to keep the magnitude of individual doses, the number of people exposed, and the likelihood of potential exposure as low as reasonably achievable below appropriate dose constraints and reference levels, with economic and social factors being taken into account.
- The process of optimisation is applied whatever the exposure situation (planned, emergency, and existing).
Guidance and exchange of experience is needed to implement ALARA in practice.

- Evaluation of the exposure situation
- Identification of the possible protective options
- Regular review of the exposure situation

Safety Culture

- Implementation of the selected option through RP-program
- Selection of the best option

Boundary conditions
- Individual Equity
- Stakeholder involvement
- Socio-economic aspects

How way to implement ALARA in practice?

EAN provides the platform for guidance and experience exchange.
ALARA Network
History and Evolution

- 1996 → start with European support
  - cooperation of experts from various European organisations mediated by the European ALARA training course
    - European Support from 1996 to 2004
    - EC support given to three workshops
    - Enthusiast individuals, supported by their institutions

- 2005 → Evolution to a self supporting network
  - EAN a legal entity, non-profit organisation under French law
    - Coordination CEPN, HPA and a group of European experts
    - EAN Administrative board (financial)
      - Chairman, vice-chairman, treasurer, secretary
    - EAN steering group (activities)
EAN objectives

- First
  - ALARA in industry and research
    - Industry → non NPP (ISOE for NPP)

- Later
  - ALARA in the medical field
  - ALARA in NORM-industry

- Future
  - All exposure situations (planned, emergency and existing)
ALARA Network objectives

- Promote a **wider and more uniform implementation** of the ALARA principle for the management of worker, public and patient exposures in all situations,
- Provide a focus and a mechanism for the **exchange and dissemination** of information from **practical ALARA experiences**
- Identify and investigate topical issues of common interest to further **improve the implementation of ALARA**
EAN participation

- Voluntary cooperation
- Broad range of experts
  - radiation protection authorities and safety authorities
  - industrial companies and services
  - research institutions
  - hospitals
  - ....
- Evolution from 8 to 20 countries since 1996
- Financial support through contributions from different institutions, companies, regulatory authorities, ...organised per country (a representative or contact person per country)
<table>
<thead>
<tr>
<th>Organisations or projects networking with EAN</th>
<th>Description</th>
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<tbody>
<tr>
<td>EFOMP*</td>
<td>European Federation of Organisations for Medical Physics</td>
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<td>EFRS*</td>
<td>European Federation of Radiographer Societies</td>
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<td>IRPA</td>
<td>International Radiation protection association</td>
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<td>EURADOS</td>
<td>European Radiation Dosimetry Group</td>
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<td>ISEMIR</td>
<td>Information System on Occupational Exposure in Medicine, Industry and Research</td>
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<td>EFNDT*</td>
<td>European Federation of Non Destructive Testing</td>
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<tr>
<td>EMAN</td>
<td>European Medical ALARA Network</td>
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<td>ESR</td>
<td>European Society of Radiology</td>
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<tr>
<td>EUTERP</td>
<td>European Network on Education and Training in Radiological Protection</td>
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<tr>
<td>RECAN</td>
<td>ALARA Network in the Central and East Europe</td>
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<td>ARAN</td>
<td>ALARA network in the ASIA Pacific region</td>
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<tr>
<td>ORAMED</td>
<td>Optimization of RAdition protection for MEDical staff</td>
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<tr>
<td>ISOE</td>
<td>Information System on Occupational Exposure</td>
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EAN Activities and outputs

- EAN Workshops
- European Surveys
- EAN subnetworks

Input

- Information Networking Workshops

Output

- Recommendations
- Guidance Return of experience

- ALARA Newsletter
- EAN Website
- recommendations
EAN workshops

- **Workshops** on different topics
  - 60-120 experts
  - Expert papers
    - Scene setting
    - Practical cases
    - Poster session
  - Working groups (questions, discussion topics)
- Output of the workshop
  - Recommendations
  - Documented in
    - Newsletter
    - EAN Website
    - National radiation protection journals
<table>
<thead>
<tr>
<th>N</th>
<th>Name and topic</th>
<th>Venue</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>ALARA and decommissioning</td>
<td>Saclay, France, 1997</td>
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<tr>
<td>2</td>
<td>Good radiation practices in industry and research</td>
<td>Oxford, United Kingdom, 1998</td>
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<td>3</td>
<td>Managing internal exposure</td>
<td>Munich, Germany, 1999</td>
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<td>4</td>
<td>Management of occupational radiological and non-radiological risks: lessons to be learned</td>
<td>Antwerp, Belgium, 2000</td>
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<td>5</td>
<td>Industrial radiography, improvements in radiation protection</td>
<td>Rome, Italy, 2001</td>
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<td>6</td>
<td>Occupational exposure optimisation in the medical and pharmaceutical sectors</td>
<td>Madrid, Spain, 2002</td>
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<td>7</td>
<td>Decommissioning and site remediation</td>
<td>Arnhem, Netherlands, 2003</td>
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<td>8</td>
<td>Occupational radiological protection control through inspection and self-assessment</td>
<td>Uppsala, Sweden, 2004</td>
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<td>9</td>
<td>Occupational exposure to natural radiation</td>
<td>Augsburg, Germany, 2005</td>
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<td>10</td>
<td>Experience and new developments in implementing ALARA in occupational, public and patient exposures</td>
<td>Prague, Czech Republic, 2006</td>
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<td>11</td>
<td>ALARA in radioactive waste management</td>
<td>Athens, Greece, 2008</td>
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<td>12</td>
<td>ALARA issues arising for safety and security of radiation sources and security screening devices</td>
<td>Vienna, Austria, 2009</td>
</tr>
<tr>
<td>13</td>
<td>ALARA and the medical sector</td>
<td>Oscarborg Fortress, Norway, 2011</td>
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<tr>
<td>14</td>
<td>ALARA in existing exposures situations</td>
<td>Dublin Castle, Ireland, 2012</td>
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Joint workshop on
ALARA Culture
and
Education and training

EAN

Importance of effective RP education and training to workers and other stakeholders

EUTERP

New European BSS
European Qualification and Credit Schemes (ECVET, EQF, …)
Effectiveness and efficiency of E&T
Practical ALARA training
New learning tools
Elements contributing to ALARA culture
Surveys

- The implementation of the European Basic Safety Standards in Directives 96/29 and 97/43 in national regulations (2006),
- The management of radioactively contaminated soils (2006),
- Potential exposures in nuclear installations (2007),
- The Diagnostic Reference Levels (DRLs) in Europe (2007),
- Radon exposure management (2010)
- Aircrew exposures (2011)
- Declaration systems of incidents (2011)
- Dose guidance for emergency workers (2011)
ALARA newsletter
- Twice a year
- Already 32 issues

EAN website
- [http://www.eu-alara.net/](http://www.eu-alara.net/)
- e-version of the Newsletters,
- papers from the workshops
- summarized conclusions
- recommendations of the workshops
- information related to ALARA.

About 1000 individuals per month visit the EAN website and perform downloads
EAN subnetworks

- **ERPAN** (European Radiation Protection Authorities Network)
  - Recommendation of the 8th EAN Workshop
  - Since 2006, meeting once a year, e-mail forum
  - National regulatory authorities → inspection programs, operational level

- **NORM**
  - Promote good radiation protection practice in the NORM industry
  - EC support during 2 years (2007-2008)
  - Current support IAF and BfS

- **EMAN** (European Medical ALARA Network)
  - Recommendation of the 6th EAN workshop
  - November 2009 after recommendation from EAN workshop
  - Implementing ALARA in the medical sector
EAN working groups

- WG on radon
  - Statement on radon → output to ICRP
- WG on ALARA culture
  - A generic paper on ALARA culture → output to IRPA 13 in 2012
  - Update of the book ALARA from theory to practice
    - “Optimisation of radiation protection (ALARA): a practical guidebook”
“Optimisation of radiation protection (ALARA): a practical guidebook”

Basic concepts of radiation protection and their origins

Examples of ALARA implementation in practice

Elements supporting the approach

Actors and their responsibilities

ALARA process

ALARA procedure

TARGET AUDIENCE
- Competent authorities
- Manufacturers, suppliers and designers
- Licensees
- Radiation protection professionals
- Professional associations
- Exposed workers
- Public
- Patients
EAN achievements

- **Recommendations**
  - → initiation new networks and subnetworks
    - ERPAN, EMAN, NORM
  - → national regulations and provisions

- **Activities acknowledged by international organisations**
  - IAEA
    - Technical support assistance in the creation of new networks (RECAN, ARAN)
  - IRPA
  - IAEA/ILO Action plan steering group
  - UNSCEAR → EAN part of the practical pillar of RP
The focus of the work of EAN is on sharing experience and the practical implementation of ALARA in all sectors where ionising radiation is applied with special emphasis on the definition, evolution and dissemination of ALARA culture.

- **Promotion of a practical implementation of ALARA**
  - convert the ALARA principle into individual and collective acts and behaviours

- **Sharing experience**
  - Open platform
  - Networking (to gather and process information)

- **Dissemination of ALARA Culture**
  - definition
  - dissemination
Networking with national radiation protection associations

- Dissemination of ALARA Culture and Promotion of a practical implementation of ALARA

- **Examples**
  - BVS-ABR, meeting on decommissioning and radiation protection, 2003
    - Optimisation and optimisation tools
  - BVS-ABR, Training day on ALARA, Oct. 2007
    - Foundations of the ALARA principle
    - ALARA in national regulation
    - ALARA in practice
  - BVS-ABR, Training day: ALARA in de medische wereld, 2008
  - BVS-ABR ALARA Culture, 2010
New challenges

- ALARA applied for all type of exposure situations
  - Planned
  - Emergency
  - Existing
- Medical sector
  - ALARA practices
  - New technologies
  - Radiological accidents
- Medical and Non-medical exposures (security)
  - Justification, optimisation
- Nuclear sector
  - Ageing of existing installations
  - Knowledge transfer
  - New designs → ALARA in design

New ICRP definitions
Conclusion

- European ALARA Network evolved from a EC funded project to a self supporting network

- Build on
  - Enthusiasm of all participants
  - Support from different institutions
  - Open discussion, informal approach

- Continue the *practical implementation* of the ALARA principle and ALARA culture for all type of exposure situations.

- National Radiation Protection associations play a key role in the dissemination of ALARA Culture and Promotion of a practical implementation of ALARA