

Optimisation of radiation protection (ALARA): a practical guidebook

Drafting remark:

To mention the reference, please constitute your list of reference, and mention them in the text like for example (ICRP, 2010)

Reference

ICRP, 2010, Recommendation from the International Commission on Radiological Protection, ICRP Publication 103,.....

Vancouver style for references (see www.icmje.org)

Plan to have a glossary

Possibility to have small boxes of text.

Type text in Times New Roman 11 – single space

1. INTRODUCTION

2. CREATION OF A RADIOLOGICAL RISK MANAGEMENT SYSTEM - BASIC CONCEPTS

2.1. INTERNATIONAL RADIOLOGICAL PROTECTION STANDARDS

Serena,

UNSCEAR, ICRP, IAEA, EC, ...

2.2. THE EFFECTS OF IONISING RADIATION ON HEALTH

Serena,

2.2.1. Deterministic effects

2.2.2. Stochastic effects

Give risk factors for all population, but also children ,....

2.2.3. Non cancer disease

2.3. THREE PRINCIPLES FOR RESPONSIBLE MANAGEMENT OF RADIOLOGICAL RISKS

Serena,

2.3.1. Justification

2.3.2. Optimising radiological protection

2.3.3. Limitation of individual doses

2.4. Dose constraints and reference levels

Serena,

2.5. Exposure situations

Serena,

- 2.5.1. Planned exposure situations
- 2.5.2. Existing exposure situations
- 2.5.3. Emergency situations

3. OPTIMISATION IN PRACTICE

3.1. ALARA process

Caroline + Fernand

evaluation – follow-up – feed-back experience

Dose reduction actions

source term, duration of exposure, number of people exposed
with already examples from various exposure situations

ALARA procedure

selecting actions and decision making process – sensitivity analysis

3.2. Various actors and their role (responsibilities)

Caroline + Fernand

Authorities,

Have to promote ALARA through regulation

Control of ALARA is different from that of limits. ALARA is an obligation of means and not of results

With references to more deep analysis of the legal aspects

Reference to the EAN website / Survey on the implementation of European Directives

If new EC directive published, quote the text of EC.

management

RP experts

other work specialities

Stakeholders

Who is in charge of gathering lessons learned + implementing them

3.3. elements supporting the approach

Caroline + Fernand

- commitment
- Education and training
- Transfer of knowledge
- structures
- tools
 - Indicators for evaluating the effectiveness of alara programs / implementation
- human factors, attitudes, behaviour

In the decision making process

- balancing radiological risk with other risks

Lessons learned

ALARA reviews, audits, inspections

4. EXAMPLES OF ALARA IN PRACTICE

Examples coming from operators, safety authorities, medical actors
need to address design, operation and decommissioning stages
Examples on the use /setting of dose constraint, or reference levels if possible
If possible lessons learned

Structure of example (should fit in one page, Times New Roman 11)

Context

Problem at stake

Methodology / protection action used

Decision making process / Results

Lessons learned

(reference)

If possible as introduction to each exposure situation, make reference also to the relevant ICRP publication (if it exists !)

4.1. Worker exposure

4.1.1. Nuclear industry

Examples from ISOE (Caroline)

Design stage, operating, decommissioning

4.1.2. Research activities (reactors, laboratories,..)

Operation and decommissioning (SCK)

Experiment in reactors (SCK)

Netherlands (SCK)

France ? (Caroline + Fernand – see sub network on research reactor)

4.1.3. Other industries Sotirios

4.1.4. Medical Sotirios

Examples from the inspection point of view (Sotirios)

Design,

4.1.5. NORM

Sotirios

4.1.6. Mines

Sotirios (example from ERPAN)

4.1.7. Waste management

HLW underground repository : Caroline ?

Medical waste

4.1.8. Emergency – post-accident situations

Frank

Emergency response

4.2. Patient exposure

Annemarie, Sotirios

4.2.1. Diagnostic

role of drl

adapt to pediatric patients

SCK/CEN

Examples from the inspection point of view : Sotirios

4.2.2. Interventional

SCK/CEN

Examples from the inspection point of view : Sotirios

4.2.3. Radiotherapy

Serena

SCK/CEN

Examples from the inspection point of view : Sotirios

4.3. Public exposure

4.3.1. Exposure from planned exposure situations

releases from “industry”, hospitals, patients

Sotirios

waste disposal or storage

SCK

transport

Sotirios transport of spent fuel from democritos reactor. ALARA issues from the authority point of view

4.3.2. Exposure from existing exposure situations

Natural radioactivity

radon : Experience Montbéliard + Suisse - Caroline

Recommendations to Estonia - Serena

mine residues

GEP Mine (Caroline)

contaminated sites

SCK

Guide book from IRSN (Caroline)

4.3.3. Emergency – post-accident situations

Frank

intervention levels, reference levels

Draft abstract for IRPA 13 – 3.5 RP Culture

Optimisation of radiation protection (ALARA): a practical guidebook

Sotirios ECONOMIDES (GAEC, Greece), James GEMMILL (SEPA, UK), Frank HARDEMAN (SCK/CEN, Belgium), Cristina NUCCETELLI (ISS, Italy), Serena RISICA (ISS, Italy), Caroline SCHIEBER (CEPN, France), Annemarie SCHMITT-HANNIG (BfS, Germany), Fernand VERMEERSCH (SCK/CEN, Belgium)

European ALARA Network Working Group on ALARA Culture

In 2009, the European ALARA Network created a specific working group on ALARA Culture. The objective of the WG is to maintain and further develop the high level of radiation protection by promoting the ALARA culture in all fields of application, implementing the ALARA principle into practice, and analysing feedback from implementing ALARA in various sectors.

One of the activities of this working group is the elaboration of a practical guidebook on optimisation of radiation protection, expected to be published by 2012.

After an introduction on the basic concepts of radiation protection and their origins, the book presents the ALARA process, the main actors and their responsibilities and elements supporting the approach. It then gives many examples of ALARA in practice for workers and public in various exposure situations, for patient protection as well as for emergency and post accident situations.

Draft abstract for IRPA 13 – 3.5 RP Culture

Development and dissemination of ALARA Culture

Sotirios ECONOMIDES (GAEC, Greece), James GEMMILL (SEPA, UK), Frank HARDEMAN (SCK/CEN, Belgium), Cristina NUCCETELLI (ISS, Italy), Serena RISICA (ISS, Italy), Caroline SCHIEBER (CEPN, France), Annemarie SCHMITT-HANNIG (BfS, Germany), Fernand VERMEERSCH (SCK/CEN, Belgium)
European ALARA Network Working Group on ALARA Culture

The need to further develop and disseminate ALARA culture comes at a moment in time where we see an increase in the applications of ionising radiations, new exposure situations to be managed, an increase of the awareness of the risk and a growing scientific knowledge of the health effects.

ALARA culture is at the heart of radiation protection culture. It is based on the scientific knowledge on health effects from ionising radiation together with the adoption of the precautionary principle, leading to the adoption of the linear dose-effect relationship without thresholds (LNT). It results in attitudes and behaviours of individuals and organisations, committed to always search for dose reduction potentialities.

Implementation of optimisation of radiation protection is an ongoing and iterative process, to keep the magnitude of individual doses, the number of people exposed and the likelihood of incurring exposure As Low As Reasonably Achievable (ALARA) taking into account technical, economical and societal factors. It requires qualitative and quantitative judgements and the involvement of all parties having an interest in or concern about an exposure situation.

The paper, elaborated by a working group from the European ALARA Network (EAN) will discuss elements constituting ALARA culture, its practical implementation according to the various exposure situations, and ways to further develop and disseminate ALARA culture.