

11.2 The ALARA programme : Ad hoc structures and adequate procedures

A need for decision, coordination and studies structures

Objectives :

- To formalize the managers commitment
- To set up places for exchange, favouring concerned stakeholders representatives working together, within the firm, the hospital,... and when the exposed people are from contractors including contractor's representatives

Means:

- Decision Structures, (perennial)
- “Ad hoc” ALARA working groups. (for a task during the needed time)
- Participation to ALARA networks (see lecture 15.1 and 15.2 on networks)

ALARA Decision Structures (1)

When the radiation risk is prominent (i.e. nuclear facilities) they often exist **ALARA committees**

- Chaired by a high level manager (often the deputy general manager), with the health physics head (qualified expert in radiological protection) as secretary
- With a mix of representatives of different services or departments (operation, maintenance, servicing, projects, infrastructures); some being permanent members, some others just for problems concerning their jobs.
- It aims at defining the radiological protection and ALARA policy of the firm, making decision on high stakes ALARA studies, supervising optimization procedures et decisions implementation, setting up ALARA working groups .

Examples of such committees have been presented in nuclear case studies

ALARA Decision Structures (2)

When the radiological risk is not prominent but just one among others (non nuclear research, medical facilities, non nuclear industry) their should exist occupational risks prevention committees where radiation protection is addressed as one component of occupational risks

Chaired by a high level manager

With representatives of different services or stakeholders.

It aims at defining the occupational protection policy and in particular radiation protection policy of the firm or institution, making decision on high stakes occupational risk management studies, supervising procedures et decisions implementation.

ALARA Decision Structures (3)

The existence of such structures is very important (but for very small firms and small medical institutions)

It is a guarantee that radiation protection and other occupational risks are actually taken into account by all, and that those in charge of their management on the spot have direct access to the top management; therefore their objectives and stakes are not mandatorily “under” those of the other specialities (operation, maintenance, doctors, researchers...)

Optimization studies and coordination structures (1)



ALARA working Groups :

They are set up for implementing an optimization devoted to a specific topic

Depending on the stakes they may be a very small group of individuals (health physics + radio-chemist see Fluorine 18 production case study) up to a big team working with a workload of several man years (see steam generator replacement case study)

They may be local in firm or an hospital for performing a local ALARA study (see most case studies) or national for performing a generic ALARA study (see medical case studies)

Members are always from different specialities

When needed they associate representatives of both utility and contractors

They may be devoted to optimizing radiation protection of a task, an operation, a facility or a category of workers (insulators for example)

They collect and analyze feedback data, they perform optimization studies

They are disbanded when the study is finished and decisions taken.

Optimization studies and coordination structures (2)

ALARA Coordinator : In some cases (very seldom) it may exist an ALARA coordinator for a big intervention (see SGR case study)

- Coordinating all ALARA actions,
- Impelling ALARA on the spot
- Diffusing information and decisions
- Collecting proposals
- Checking the commitments

ALARA Networks

These are not structures within a firm or an institution

They mix representatives from different firms and stakeholders in order to facilitate optimization implementation through feedback exchange, updating of knowledge,...

They may be worldwide from one area only (ISOE for nuclear power plants for example)

They may be multi sectors from one region in a country (French RPO's networks), from one region in the world (Regional ALARA Networks)...

All of them favour increase of legitimacy and good practices

What is the situation in your facility or country?

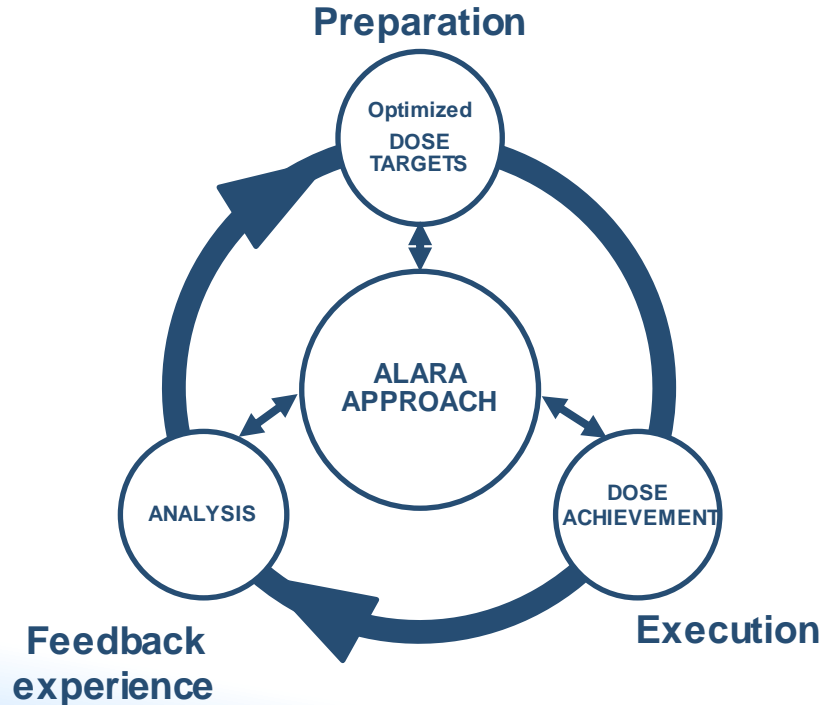
Have you had any opportunity to see or even participate to such type of structures?

What exist in your facility as decision and coordination structures for radiation protection and other occupational risks?

Can you describe it ??

These structures will be the most efficient if and when procedures exist

Within the ALARA approach adequate procedures are needed



The word procedure is used here in a more generic sense than the so called Optimization procedure already often mentioned.

It means here a set of formalised “rules “ used within an organisation to ensuring the “best” implementation of Optimization ...
... according to the “stakes”

They may be set up internally or taken from external guidance

“Best” implementation of Optimization ...according to the “stakes” (1)

It means that it is necessary to set up rules defining what is reasonable as resources and means for implementing optimization in different circumstances. The answer to questions such as:

During the preparation or design phase of an operation

What resources to allocate to implement an ALARA study?
who will participate to that study?
who will make the decision?
How will this be inserted into contracts?.....

“Best” implementation of Optimization according to the “stakes” (2)

The answer.....

During the execution phase

What solutions are implemented to follow up the doses?
who have access to that information?
when is it needed to have stop points?
who decide about corrective actions?
What impact on contracts.....

...

Will be different according to the stakes : it will not be the same resources and means for a one man Sievert operation and a few man micro Sievert one.

To find procedures in line with the stakes (1)

- The objective is to define different formalization levels for the optimization analysis; the decision-making procedures; the follow up and feedback analysis.
- What is observed is that there are 3 (*SCK/CEN, AREVA,...*) or 4 (*EDF, NCRP,...*) levels, depending on the firm or institution
- These levels are determined according to the stakes in terms of :
 - *Collective operation dose*
 - *And/or max. expected individual dose (per operation or day)*
 - *And /or dose rate at the workplace*
 - *And or contamination level at workplace*
 - *And /or opportunity (for example when an operation will be repeated several times it can be “upgraded”)*

To find procedures in line with the stakes (2)

- Predicting these criteria is then needed as a preliminary step before any **optimization** implementation both at the design stage or preparation stage of any operation.
- *It has then to be reminded that just having done a dose prediction is not having implemented **optimization**; it is just a first step to know the stakes and then to ask:*

“Is that optimized ? What more can be done reasonably to optimize? “

Whatever the stakes the procedures for implementing optimization

Will cope with :

- Operating rules for the decision and coordination structures,
- How to use the optimization tools,
- Guidance for analyzing an operation (both at the design, operation, and feedback phases)
- Description of decision aiding procedures
- Self assessment guidance on optimization implementation

Example 1: the NCRP recommendation for US Nuclear facilities (external guidance)

Category	Dose estimate	Review
1	<10 man·mSv	By a radiation protection technician as part of a radiation work permit (RWP) preparation
2	10–50 man·mSv	By a radiation protection technician and radiation protection supervisor
3	50–500 man·mSv	By a radiation protection supervisor and engineer responsible for ALARA planning Dose estimate and planned dose reduction techniques to be documented in a pre-job report to management
4	>500 man·mSv	In addition to the above, review by the plant's management or an ALARA committee

That proposal corresponds to 4 levels; relying on a single criterion

Example 2 : a more detailed set of procedures at EDF / France (1)

An operation is composed of several jobs aiming at the same goal (example of operations: the outage, the fuel transport...)

For each job a risk analysis must be performed; it should include a predictive dose evaluation

For each job EDF has decided to implement internally simplified or more complex ALARA studies according to *different criteria*

The jobs are ranked according to *four levels* of radiological stake.

- Level 0 : low level stake
- Level 1 : medium stake,
- Level 2 : significant stake,
- Level 3 : important stake

Example 2 : a more detailed set of procedures at EDF / France (2)

Level of stake for the job	0	1	2	3
Collective dose (man mSv)	1	10	20	
Dose rate (mSv/h)	0.1	2	40	
Radiological risk of contamination	Values to be decided at local level			

The level for a job corresponds to the highest scoring on one criterion

If a job is repeated regularly it is upgraded by one level which modifies the procedure to be followed.

Example 2 : a more detailed set of procedures at EDF/France (3)

Level 0 :

- No formalized optimization analysis; implementation of common sense for reducing doses and normal radiological protection rules
- For the three other levels a more or less formalized optimization analysis is performed.

Level 1:

- Simplified optimization analysis performed by the job specialists identifying the main protection options, the results are available on the Radiological Work Permit (RWP). The decision making process rely mainly on common sense.
- The job specialists are responsible of the validation of the analysis
- No formalized optimization analysis; implementation of common sense for reducing doses and normal radiological protection rules

Example 2 : a more detailed set of procedures at EDF/France (4)

Level 2 job:

- In depth optimization analysis, performed by the job specialists in collaboration with health physics team. It has to identify the contributing factors to the dose and how to reduce it; the results are available on the RWP
- The HP department is responsible of the validation of the analysis

Level 3 job:

- in depth optimization analysis under the health physics team responsibility in collaboration with the job specialists; it is more formalized than the others;
- the contribution of sources to dose rate have to be provided, the radiological protection options must be described with their efficiency and costs.
- At least 3 scenarios must be compared: the decision making process must take into account at least the cost, and benefits and when necessary it should rely on several other criteria.
- The ALARA Committee is responsible for validating the analysis through formalised optimization reviews for the project.

Example 2 : a more detailed set of procedures at EDF / France (5)

Other procedures define the optimization implementation's requests to contractors at different steps according to the stakes; for example in the highest levels

- To include Scenarios proposal for the answer to the call for tender
- to prepare optimization analysis during the job preparation (required in the order),
- to produce a feedback optimization report (required in the order)

They will then be evaluated on their efficiency in implementing optimization both for external and internal exposures

Criterion	Scores & Weighing factor
Organization of radiological protection	From 0 to 1
Feedback integration	From 0 to 1
Optimization and design of the job	From 0 to 1
Preparation of dose forecast	From 0 to 1
Optimization analysis and options	From 0 to 1
Sensitivity analysis, mishaps	From 0 to 1
Collective dose forecast credibility	From 0 to 1
Individual dose forecast credibility	From 0 to 1
Mean SCORE	70%

Example 2: a more detailed set of procedures at EDF/France (6)

Other procedures define questions, to be addressed and answered to, in order to assess the efficiency of the optimization implementation in a facility.

The main items to be addressed should be :

- Management, organization and program health physics -ALARA
- Training
- Control of operations and jobs
- Control of exposures
- Management of radiological protection feedback
- Relationships with contractors

Each item will be subdivided into several sub items; for example, the main item

“Management, organization and program HP-ALARA”

will be divided into 7 sub item; the first one being
“Defining the ALARA programme”

Example 2 : a more detailed set of procedures at EDF / France (7)

To each sub item will correspond a set of questions and scores for each answer

To evaluate “**Defining the ALARA programme**” one has to check :

The existence of formal documents describing the roles, objectives, resources, responsibilities...

The Existence of an ALARA Committee

The ad equation of participants and chairperson

The efficiency of the Committee (frequency of meetings, number of decisions, attribution of follow up responsibilities, ...)

What about your situation?

What kind of procedures do exist in your domains?

If no procedure exist dealing with ALARA are they procedures dealing with quality assurance or safety?

What are the differences with what we have seen here?

What are the common points?

What can be expected in the future?

Who should take the lead for elaborating these procedures?

Conclusion on procedures

The previous presented procedures are just examples; the set of adequate procedures will **cover all the different aspects** of any quality, or safety program adapted to radiological protection, including training, communication,

In those areas where the radiological risk is prominent all these procedures **should remain totally coherent** with the procedures dealing with the other risks and should allow an optimal management of all risks.

In areas where the radiological risk is not prominent, one cannot expect the setting of such procedures solely devoted to the radiological risk

However all these procedures should exist for **preventing occupational risks globally**; the radiation risk being one among the other, with some specificities to be addressed. They will more often come from external guidance in medium or small facilities or institutions.