

1st Meeting of the EAN WP2 Reflection Group
– 3 march 2011

Participants

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Trasnusafe and Working Package 2 presentations

The TRASNUSAFE project aims at to design, develop and test two relevant training schemes on Nuclear Safety Culture with a European environment, based on a specific evaluation of the training needs. The project is developed according to 4 Working Packages:

1. An analysis of the training needs will be carried out across Europe through data collection and seminars organised in different regional locations (WP1),
2. The links between the ALARA principle currently used in the radiation protection community and the safety culture of the nuclear industry will be clarified to reach a common approach making the attendance of managers from both reflection groups to a basic training module possible (WP2),
3. Based on the results of the analysis of the training needs, the two training schemes will be designed and developed with a common generic basic module, and four specialised modules (WP3),
4. The training schemes will be validated by testing the new teaching modules by means of pilot sessions and by making corrections where they appear to be necessary (WP4).

The WP2 work will be articulated with 2 Reflexion Groups (RGs): the EAN and the EUTERP RGs will work in parallel before providing a common report in Autumn 2011, after a “restitution workshop” in September 2011 in Roma, and will lead to a proposal for a topical PhD thesis.

The EAN RG, coordinated by CEPN, will meet a second time on the 25th May 2011 in CEPN at the occasion of the EAN Steering Committee meeting and then, together with the EUTERP RG representatives on the 2nd of September 2011, in Roma.

Organisation of the EAN Reflexion Group meetings

It is proposed to use the IDPA approach for the first and second meeting of the reflexion group. This approach consists of the following steps:

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| <ul style="list-style-type: none"> - Identification of the issues at stake concerning safety culture - Diagnosis of the present situation in Europe | | 1 st meeting |
| <ul style="list-style-type: none"> - Prospective positive/negative and short/long term scenarios - Actions to initiate | | 2 nd meeting |

Findings and Outputs of the meeting

Identification of the issues at stake¹

The discussion focussed on how to improve the ALARA culture of safety managers in the industry (especially in the non electronuclear industry) and the medical sector. A summary of the questions that have been discussed is given hereunder:

- Who should participate to the training modules?

The participants agree on the need to address the course to the general managers from different sectors (hospitals, NORMs, non-electronuclear industry, nuclear industry, etc.) that have the safety under their responsibilities.

- What should be the aim of the proposed training course?

The aim of the training course should be to provide the minimum knowledge and competences that are necessary for the general managers who have responsibilities in safety and/or RP (Radiation Protection) but, who are not necessarily experts in safety. It was concluded that “safety managers” is not a relevant term for the TC (Training Course) addressees, especially with regard to the medical sector. The proposed courses should take into consideration the medical and non-electronuclear industry sectors.

- Are radiation protection and safety cultures compatible? What safety culture does mean? Does it include radiation protection issues?

A clarification of what is covered by the ‘safety’ words would be necessary, before to design the TC. The proposals of the reflection group are the following:

- **Nuclear safety²** covers the actions taken to prevent nuclear accidents and radiological events (or to limit and mitigate their consequences). The word ‘nuclear safety’ is often connoted to nuclear industry even if the word should include other areas (e.g. medical field, non-electronuclear industry).
- **Radiation protection**, sometimes known as **radiological protection**, includes scientific bases and management and organisational issues that allow to protecting people and the environment from the harmful effects of ionizing radiation. The system of radiological protection is described in details in the ICRP recommendations (especially Publications n° 60 and 103); it is based on the implementation and respect of the justification, optimisation (ALARA) and limitation of exposures principles.
- **Radiation safety** is known as the protection of personnel against harmful effects of ionizing radiation by taking steps to ensure that people will not receive excessive doses of radiation and by monitoring all sources of radiation to which they may be exposed.

The discussion can be summarized as: *Nuclear Safety $\subset$ ³ Radiation Protection $\subset$ Radiation Safety.*

The application of occupational radiation protection principles is not developed at the same level in the nuclear and the non-nuclear fields. The latter gives a preponderant room to the limitation principle and although it may be applied on the same way, the optimisation principle (ALARA) is less known and less applied in the medical sector and the non-electronuclear industries. As a result, ‘Radiation safety’ is generally perceived and reduced to the ‘prevention of radiological accidents’ and the

¹ See also contribution from Romania and Sweden on this ‘Identification part’ in the appendix

² In Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations "nuclear safety" is defined as "achievement of proper operating conditions, prevention of accidents and mitigation of accident consequences, resulting in protection of workers and the general public from dangers arising from ionizing radiations from nuclear installation".

³ includes

‘limitation of exposures’, especially in the non-nuclear and medical sectors. Nevertheless, it has been considered that an in-depth comprehension of the justification and optimisation principles is a fundamental part of the knowledge and competences of the addressees of the Trasnusafe TC.

To conclude, radiation protection, radiation safety and nuclear safety are all together part of a ‘global safety culture’. Consequently, the EAN RG recommends, not focussing too much the Trasnusafe TC modules on ‘nuclear safety’ issues.

- What are the specificities of the ALARA culture as part of the radiation protection culture?

The EAN Members reminds that EAN has launched in 2009 a specific WG which reflect on the definition of ALARA culture (integrated in a broader reflection and establishment of ‘guiding principles’ on radiation protection culture, made at the initiative of the International Radiation Protection Association - IRPA). The EAN has stated that the optimisation concept is the ‘core’ (or the ‘stone’) of the radiation protection culture and is:

- “Characterised by risk awareness, balanced judgement of risks and benefit, and the capability to develop and use required skills, competences and tools for risk assessment and management, balance of resources and economic and societal considerations,
- Realised through trans-disciplinary education and training tailored at each level,
- Supported by management commitment, guidance and supervision of competent authorities,
- Making use of a clear definition of responsibilities.”

EAN will keep the Trasnusafe Members informed on the evolution of its work on that specific question.

- What is the dissemination level of the ALARA culture (i.e. knowledge, skills, competences and attitudes) at the level of the safety management? (a clear distinction between the different sectors – medical, non electronuclear industry, nuclear industry – will be made)

Globally, the ALARA culture is not very well known and disseminated, especially in the medical and non-electronuclear industry (see a more precise diagnosis in several European countries hereafter).

In the TC modules developed within the Trasnusafe Project, the ALARA culture should be considered as part of the safety culture. It is needed to make managers aware of the main radiation protection concepts including optimisation, as defined in ICRP 60 and 103.

- What topics would attract the managers?

Key studies and practical examples have to be presented in addition of the theoretical concepts. The first proposal of the generic module made by the WP3 leader at the Trasnusafe kick-off meeting has to be revised in order to take into account the differences between the various sectors (nuclear, medical and non-electronuclear industry).

The duration of the course could be defined with a one-day generic module and a one-day for a specialized module according to the sector. The EAN RG Members consider that it will be very difficult to mobilize managers for such a TC more than 2 consecutive days. However, it was also concluded that such a training course is obviously necessary.

Diagnosis of the present situation in Europe concerning the implementation of the ALARA principle (and the safety culture)

Several participants indicated that the remarks made state their personal views.

Romania (see appendix)

Belgium:

- Nuclear industry:
 - o ALARA is implemented from the 90’s.

- Safety culture policies are well implemented in NPPs from the 90's and in research centres and smaller facilities since ~ 2005.
- Safety culture is now extended to include sites' security (e.g. against terrorism). This need for 'security culture' is an extension that sometimes gives conflict with the safety culture requirements.
- ICRP recommendations, IAEA standards are taken into account through an Integrated (Risk) Management System (request by authorities to self-evaluate status as compared to the IAEA GS-R-3 document, anticipating the conversion into Belgian legislation of the EU directive on nuclear safety).
- The top-management level is integrated in the implementation process.
- Medical field:
 - The main issues and considerations focus on the justification of medical acts.
 - The ALARA awareness of medical doctors has to be increased, especially in smaller hospitals.
 - ALARA is better and better considered and implemented: as an example, reference levels (of doses), have been published by the Belgian authority (FANC).
- Other industry:
 - The ALARA implementation is very variable according to companies. Some of them lack knowledge of radiation protection issues including ALARA totally.
- NORMs:
 - Inventories are made to identify problematic sites and companies. The safety controls are established, but are often minimal, and the ALARA principle is not very well implemented.

Croatia:

- ALARA concept is known from many years, but mainly by RPEs.
- Though its implementation started 1 decade ago, the ALARA culture is not completed, especially in the medical field.
- Education and training programmes have been organised by the regulatory authority: 5 000 exposed workers are retrained every 5 years (2 training cycles already achieved). However, the results are not very satisfactory. Groups or organisations participating in international projects (e.g. IAEA) have a better knowledge.
- New educational training centres are in course of creation with generic and specialised modules. These modules will try to focus more on the optimisation concept. The courses will use a 'bottom-up' approach by beginning with the workers training, as it is difficult to train the top management in Croatia, especially the managers in hospitals. The Croatian legislation will give the basic framework for training schemes (former TCs were too much focussed on the legislation).

Italy:

- Nuclear field: in 1988, as a result of the popular referendum held in 1987, after the Chernobyl accident, the Italian Government decided to stop the nuclear energy generation. Therefore, no NPP is operating now in Italy, but the old units are at the decommissioning stage. The involved NPPs are two BWRs (*Garigliano*, *Caorso*), a PWR (*Trino*) and a gas graphite reactor (*Latina*), which had operated for decades. Moreover, the governmental decision blocked the construction in progress of *Montalto di Castro* (2 X 1000 MWe BWR) NPP and *Trino 2* (2 X 1000 MWe PWR) NPP, whose operation was planned to start in 1990. All the decommissioning activities are committed to SOGIN, Nuclear Plant Management Co, which is "a joint stock company responsible for the execution of activities related to the dismantling of the dismissed Italian nuclear power plants, to the back end of the fuel cycle, to the sites restoration and/or re-utilisation, and to the business development towards the market". SOGIN is well aware of the ALARA principle.

- Medical field: ALARA culture is spread among medical physicists, radiologists and nuclear medicine specialists, but lack of ALARA culture can be easily found in other physicians. The need to educate particularly general practitioners (who in Italy are the "referrers"⁴ as defined in the Draft Euratom Basic Safety Standards Directive version 24 February 2010), as well as patients has been identified.
- Other industry: the metal industry (e.g. melting industry) has a long 'experience' with contaminated scrap metals. In this industry, the radiation protection culture has improved after the occurrence of several incidents.
- NORMs: The Italian Radiation Protection Act - transposing the Council Directive 96/29/Euratom - issued in August 2000 as the Legislative Decree 241/2000, set obligations⁵ (experimental measurements, evaluation of the radiological situation, eventual adoption of corrective measures, etc. and time scheduled for all of them) on some NORM industries. An initial list of work activities subjected to regulation was annexed to the Legislative Decree. It is worth to note that - in some situations - the application of the ALARA principle resulted in conflict with the non radiological safety legislation. This Decree, unlike the EURATOM Directive, also regulates exposure to radon in spas, as a particular case. It has to be noticed that there is no clear position of the EU on this point, even in the new Draft Directive cited above.
- More generally, in Italy there is a need to have radiation protection experts even if there is no NPP. As a lot of experts already retired and several retirements are expected in the forthcoming years, there will be a crucial problem of inter-generational transfer of competences. An exception to this shortage is actually in hospitals, where a lot of young medical physicists were assumed in the last years.

Portugal:

(Pedro Vaz indicated that he was stating his personal views and he emphasized that he was not mandated to state the Portuguese official views.)

- It has to be noted a longstanding lack of a regulatory authority for radiological protection, and the resulting harmful consequences of such a situation, namely the lack of enforcement in/for the radiological installations and practices and the potential drawbacks it represents for radiation safety.
- He noticed that ITN (the Nuclear and Technological Institute), a technical body (research institute) from the Ministry of Science, Technology and Higher Education is seldom called to fulfil regulatory duties that are not in its mission or competences. He also made explicit the role that the General Directorate for Health (DGS) is playing as the licensing entity for the medical and industrial applications of ionizing radiation.
- RP programmes are not existing in several radiological installations, but a significant improvement of the situation has to be noticed. However a lack of enforcement (e.g. in terms of inspection) of radiological installations is observed.
- The first training course for RPOs in the medical and industrial sectors, organized by ITN with the sponsorship of the DGS, has been shaped and will soon start
- The official recognition of the MPE (Medical Physics Experts) by the competent authorities is not yet accomplished.
- There is no specific legislation related to NORMs.

Germany:

- Nuclear field: Safety culture is well known in this field, notably thanks to the international recommendations (e.g. IAEA documents).

⁴ The definition is "a medical doctor, dentist or other health professional, who is entitled to refer individuals for medical exposure to a practitioner, in accordance with national requirements"

⁵ S.Risica, F.Bohicchio, C.Nuccetelli The Implementation of Title VII of the Council Directive 96/29/Euratom in the Italian Legislation (2005).The Natural Radiation Environment VII (J.P.McLaughlin, S.E. Simopoulos and F. Steinhäusler eds.), Elsevier 2005, 85-94

- Other sectors: The ALARA concept is better known than safety culture.
- Medical field: Reference levels are implemented even in diagnosis as requested by the European directive.
- It is necessary to widely implement the ALARA concept at the European level. The European projects are a good opportunity to do so.
- The German RP society is doing a lot for promoting the ALARA culture dissemination.

Greece:

- Nuclear field: No NPPs
- Although there is a significant improvement concerning the implementation of ALARA culture in all fields of ionising radiation applications (medical, industrial, research and educational) in the country, there are always more things to be done.
- The Greek Radiation Protection Regulations (GRPR) require the implementation of appropriate quality assurance programs in ionising radiation laboratories. The procedures included in these programs should be ALARA (safety) oriented.
- Medical field: Medical Physicists in large hospitals should organize seminars on radiation protection for medical and non medical personnel. The curricula of these seminars should be approved by the GAEC and they are a very effective way for the diffusion of the ALARA culture.
- The GAEC checks the implementation of the ALARA/Safety culture in ionising radiation laboratories during the on-site inspections.
- Industry: Radiation Protection Officers should have appropriate education and training on radiation protection.
- The curricula of the Greek universities courses on radiation protection should be approved by the GAEC.

Austria:

- Nuclear field: no NPPs.
- The transposition of radiation protection European directives has been made. Training is part of licensing (see RPOs training).
- ALARA concept: Reference (medical field) and constraints (other fields) levels are used.
- Safety culture: Some “train the trainers” lectures are given to radiation protection officers regularly before they train the RP workers.
- Some short training sessions are also organised for workers and other potential stakeholders (policemen, red cross, etc.)
- More generally, the top management is not very involved in radiation protection issues in Austria and few young people are involved in these issues.

Slovak Republic:

- Industry: From the point of view of the managers, implementation of safety culture is, at the first sight, a cost. Its implementation has then to be improved.
- Medical field: The safety culture is not well implemented.

France:

- Nuclear field: ALARA culture is quite well implemented at the level of the licensees but there is still a need to work with the contractors.
- Medical field: at the beginning of 2000, there was a lack of safety culture. Following serious radiotherapy accidents and the creation of ASN in 2002 (growing its scope of competences, including medical field), a lot of efforts have been made to improve the situation. However, there is still room for improvements in other medical applications staff (radiographers, surgeon, interventional radiographers, etc.), especially in some specific hospitals where radiation protection culture is not enough disseminated as the top management doesn't show

any interest on this issue. However, in France, there is an obligation of declaration of incidents and accidents in the medical field. The ASN has the power to close hospitals after accidents.

- Other industry: a new accredited training ('CAMARI') enables to train workers on radiation protection issues (but not managers).

Next Meeting

The next Reflexion Group meeting is scheduled on the 25th May 2011 in CEPN at the occasion of the EAN steering committee meeting.

Appendix - Contribution from Romania (e-mail sent by Mr. Petre Ghitescu before the meeting)

1. I-Register- Identification.

The ALARA principle was introduced in official documents issued by the regulatory body only last December.

At educational level, in university courses there are only references at ALARA in courses like "Nuclear Reactor Engineering", "Reliability of NPPs" but not in "Radioprotection". Moreover, the people from nuclear medicine as well as from other non-electric industries have no education in that.

At safety management level competence or even knowledge have those, whose background is nuclear engineering and are involved in design or operation.

What should be done? Most probably we have to start from newly introduced regulation and via regulatory body to suggest to organize a short course or to find another way to easily introduce the new topic to the managers and other personnel when needed. WP2 should issue this kind of suggestions.

2- "D" Register- Diagnosis. It is expected that the Romanian Regulatory Authority CNCAN, who is a participant in this project, will issue some recommendations* on how to implement the norms. As nothing is referred to other fields (nuclear medicine or else) but nuclear power (site licensing, design and operation), we'll see to which extent ALARA principle will be introduced. Probably we'll ask some input from CNCAN.

*The recommendations are: Starting 21.12.2010 the Romanian Regulatory Body CNCAN introduced new regulation regarding the licensing of location, design and construction of NPPs. The new regulation introduced as a "must do" obligatorily implement and respect ALARA principles in these activities.

The document entitled "Nuclear Safety Norms regarding the location of NPPs" stipulates in Chapter 2 – "Nuclear Safety general objectives and requirements" art.3 and 4:

- Art.3: ... "The nuclear safety general objective to be taken in to consideration in choosing the location of the NPP is to minimize the radiological risks for the professional staff, population and environment according to ALARA principles".
- Art.4: ... "Selection of the NPP site and the project concept should identify all reasonable possible actions to prevent events leading to exposure of professionally involved staff, population and environment over the maximal admitted levels permitted by the existing legislation. Also, all possible and reasonable measures limiting the consequences of nuclear accidents should be identified if the case arises".

Chapter 6 defines ALARA principle as "the principle implying that the license applicant or owner should demonstrate that all measures to optimize the nuclear safety and radioprotection are taken, thus ensuring that all exposures (including the potential ones) are maintained at the lowest reasonable possible level, taking into consideration the technical, economical and social factors".

The regulatory "Nuclear Safety Norms regarding NPPs design and construction" issued also 21.10.2010 is pointing in Chapter 2- "Nuclear Safety principles and design general objectives" that:

-Art. 4:- ... "When designing a NPP the general objective of nuclear safety is to ensure its reliable operation, and to mitigate the risks for the professionally involved staff, population and environment. The measures to be implemented have to be in accordance with the ALARA principle".

-Art.5:.... "NPP's design and construction should take all possible and practicable measures to prevent events leading to exposure of professional staff and population over the limits accepted by the existing legislation. Also it should be taken all reasonably possible and practicable measures to limit the consequences of nuclear accidents in case they occur.

The ALARA principle has the same definition as "the principle implying that the license applicant or owner should demonstrate that all measures to optimize the nuclear safety and radioprotection are

taken, thus ensuring that all exposures (including the potential ones) are maintained at the lowest reasonable possible level, taking into consideration the technical, economical and social factors”.

Contribution from Sweden (e-mail sent by Mr. Lars Axelsson after the meeting)

1. I-Register- Identification.

- *Are radiation protection and safety cultures totally compatible?*

Yes, overall that is the case. Safety culture is a shared frame of reference about risks and critical issues (safety, radiation protection, security, etc.). But there might be conflicting goals in the medical field or in extreme situations in nuclear power or other industry at times. To reach a better end result there might be a requirement to expose a patient or staff for higher radiation levels than normally accepted. On the other hand, if this is based on shared assumptions about the risks, how to value and to best act in the specific cases and activities this makes the safety culture concept and radiation protection compatible.

- *Should ALARA be considered as part of the safety culture?*

Safety culture is a concept that has been around for 25 years now. To come up with new culture concepts is probably not the best way to go. This concept can cover also the ALARA approach. (Organizational) Safety culture should be seen more as an ‘umbrella concept’ covering the attitudes towards risk and the management of risk whether it concerns safety, radiation protection or security, and the impact of the attitudes, beliefs and assumptions about safety, radiation protection and security issues. ALARA should therefore be considered as part of the organizational safety culture. It cannot be a specific culture for each activity. The organization has the culture it has.

The organizational culture should therefore support all the important and critical activities (radiation protection, safety, security, etc.). When it comes to ALARA this is therefore a question about making sure the ALARA principle is receiving the attention it must have.

- *What are the specificities of the radiation protection culture in comparison with safety culture?*

See above.

- *What are the improvements needed?*
- *What are the basic knowledge and competencies in RP that safety managers should have? Of what importance is it? What are the key elements that should be introduced in their E&T?*

Leaders in the organization must have a reasonable understanding about radiation protection and the ALARA principle. There might not be a need for advanced in-depth theoretical knowledge about radiation protection, but courses should cover the general understanding about radiation protection, principles for radiation protection and the ALARA approach.

Important is to focus on discussions about the issues. The senior managers should also have a good knowledge about their own radiation protection organization (radiation protection specialists) and know when to use and/or contact it.

2nd MEETING OF THE EAN TRASNUSAFE REFLECTION GROUP
25th May 2011 in CEPN, Fontenay-aux-Roses, France

The general objective of TRASNUSAFE is to design, develop and test two relevant training schemes on Nuclear Safety Culture with a European environment, based on a specific evaluation of the training needs. This objective includes the four following specific work packages, with their own goals and deadlines:

1. An analysis of the training needs will be carried out across Europe through data collection and seminars organised in different regional locations (WP1),
2. **The links between the ALARA principle currently used in the radiation protection community and the safety culture of the nuclear industry will be clarified to reach a common approach making the attendance of managers from both groups to a basic training module possible (WP2),**
3. Based on the results of the analysis of the training needs, the two training schemes will be designed and developed with a common generic basic module, and four specialised modules (WP3),
4. The training schemes will be validated by testing the new teaching modules by means of pilot sessions and by making corrections where they appear to be necessary (WP4).

The EAN reflection group (WP2-EAN-RG) is created in the framework of WP2. A parallel reflection group is organised by SCK-CEN with EUTERP Members (WP2-EUTERP-RG). The work methods of both reflection groups may be different. However, a restitution seminar will be organised in Autumn 2011, before to write the common report (which is the WP2 deliverable) of both reflection groups.

(See page 2)

Second WP2-EAN-RG Meeting Agenda and Work Method - May 25, 2011 (10 am - 4 pm)

After a brief reminder of the 1st meeting main outputs by CEPN, the reflection group will start its work on the 3rd and 4th steps of the adopted approach (see hereafter the working method adopted during the first meeting). For these two steps, each participant will be invited to express her/his point of view during at least two consecutive round-tables (~5mn/person each).

Working method:

In order to structure the debate, the group discussions follow a specific dynamics. The discussions are split into four ~2 hours thematic “registers” named “I” - “D” - “P” - and “A” (see hereunder). This working method is also chosen to allow all participants to participate and provide the reflection group with their personal viewpoints and ideas.

- 1. *The “I” Register* - *An Identification of the issues at stake and questions to be treated by the reflection group. The discussion will focus on how to improve the ALARA culture of safety managers in the industry (especially the non electronuclear industry) and the medical sector. As first and non-exhaustive list of questions to touch on is given hereafter:*
 - 2. *The “D” Register* - *A discussion on the present situation in Europe (each participant will elaborate a **Diagnosis** for her/his country about the questions identified in the “I” register),*
 - 3. *The “P” Register* - *A discussion on the future possible evolutions (What if...?). This register aims at identifying Prospective positive/negative and short/long terms scenarios if questions/problems identified in both I and D registers are (or aren’t) solved.*
 - 4. *The “A” Register* - *An identification of the Actions to initiate (especially in terms of training of the safety managers). The WP2-EAN-RG will identify the minimum content of the generic and specific TRASNUSAFE training modules, which would include ALARA considerations. The reflection group will also identify two or three typical case studies (presenting lessons to be learned from incidents / accidents and/or good ALARA practical examples), which could be worthwhile to introduce in the generic or specific TRASNUSAFE training modules.*
- 1st meeting –
3 March 2011
- 2nd meeting –
25 May 2011